

MILITARY REVIEW

VOLUME XXVI

NOVEMBER 1946

NUMBER 8

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MILITARY REVIEW—Published monthly by the Command and Staff College at Fort Leavenworth, Kansas. Entered as second-class matter August 31, 1934, at the Post Office at Fort Leavenworth, Kansas, under the Act of March 3, 1897. Subscription rates: \$3.00 (U.S. currency) per year for 12 issues. No extra charge for foreign postage on new or renewal subscriptions. Reprints are authorized, provided credit is given the "MILITARY REVIEW," C&SC, Fort Leavenworth, Kansas.



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The Capture of Muhlhausen

BRIGADIER GENERAL R. W. GROW, *United States Army*

THE operation described here was typical of many during the great exploitation east of the Rhine in March-April 1945. There are several important tactical principles in-

"Seize Kassel," (about 100 miles air-line). By dark on the second day (30 March) a line some five miles south of Kassel had been reached. Resistance which had been



Wreckage and equipment pushed into a river in Germany by the 6th Armored Division. (Signal Corps photo.)

involved and the action was so successful that it warrants study.

Background

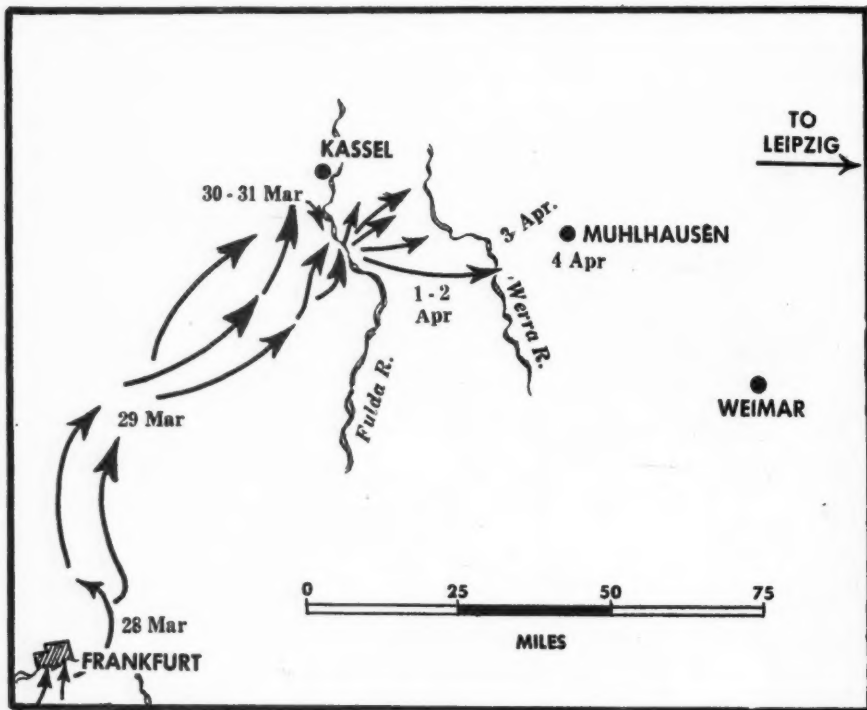
After crossing the Main River from south to north, a few miles east of Frankfurt late on 28 March, the 6th Armored Division came under XX Corps and was given the mission:

scattered then suddenly stiffened to the extent that a coordinated attack by at least the whole division would be required. In the meantime the 80th Division was closing up, so on corps order the latter took over the mission of capturing Kassel to the north while the 6th Armored turned east initially with an objective of Leipzig (125 miles),

changed late on 31 March to Weimar (80 miles a little south of east). To reach either objective the general route lay through Muhlhausen.

As can be seen from Sketch 1, the division operated in multiple columns, four to six

tured one had to be built after the site was seized. There was always the question: Should we build more than one bridge in order to cross faster? The answer depended on whether material was available to build two or more simultaneously, or could we build



Sketch 1.

(not all of which are shown); but was forced to cross both the Fulda and Werra Rivers in a single column. The reasons for this constitute an interesting study in themselves. It was SOP in the 6th Armored Division to hit any river on as broad a front as possible with four or more columns if routes were available; to seize initially existing crossings, if any, and establish small bridgeheads. Then depending upon how many crossings were secured we poured everything over the most suitable ones. If no bridge was cap-

one and get everything across it before material for a second could be spotted.

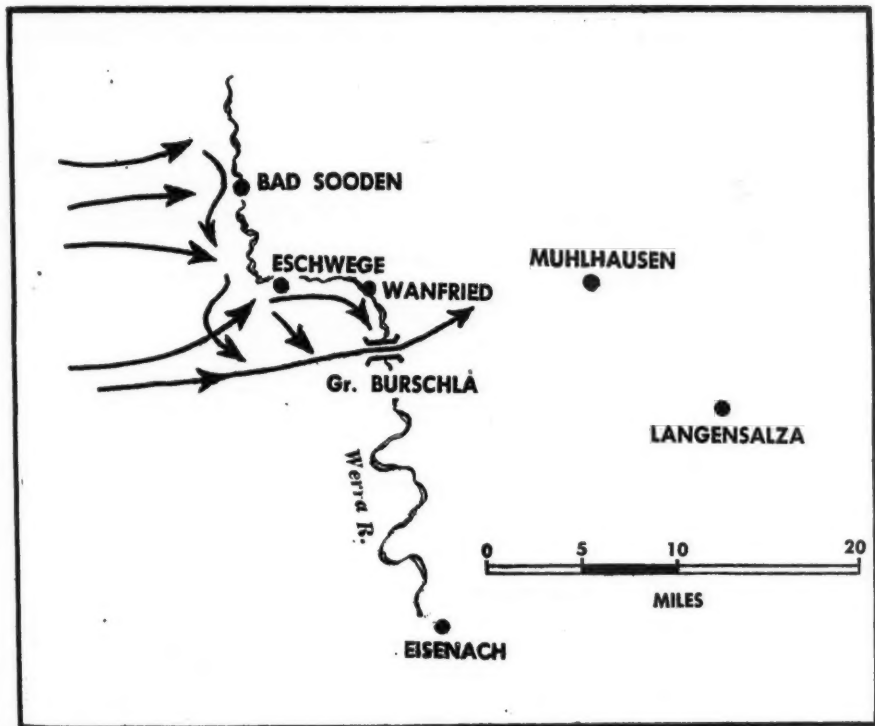
All bridges over the Fulda south of Kassel had been destroyed except one railroad bridge which was partially gone (one track of the double track was left). The best bridging site appeared to be opposite the 69th Combat Team, which fought its way across dismounted against machine-gun fire on 31 March. A bridge was built that night. The Cavalry Reconnaissance Squadron picked its way precariously across the railroad bridge

a few miles to the north, and the balance of the division crossed the engineer bridge on 1 April, immediately developing into six columns on the east bank.

The Werra River presented a slightly different problem. Each column had encountered

the three left columns (CCA) were pulled to the south and again the whole division crossed a single bridge, fanning out on the east bank and continuing on 4 April.

Had we given the enemy more time by advancing on a narrow front, the bridge which



Sketch 2.

considerable opposition and enemy air had been particularly active on 1 and 2 April. Of the six columns the one on the extreme right captured a bridge intact. The one on the extreme left had an intact bridge in its front strongly defended. Therefore the three right columns (CCB) were all diverted over the captured bridge at once while the attack on the left (north) bridge defenses continued throughout 3 April. The enemy finally destroyed the bridge before it could be seized so during the night of 3-4 April,

we seized would have been blown, as it was prepared except for the placing of explosives which had not arrived.

Capture of the City

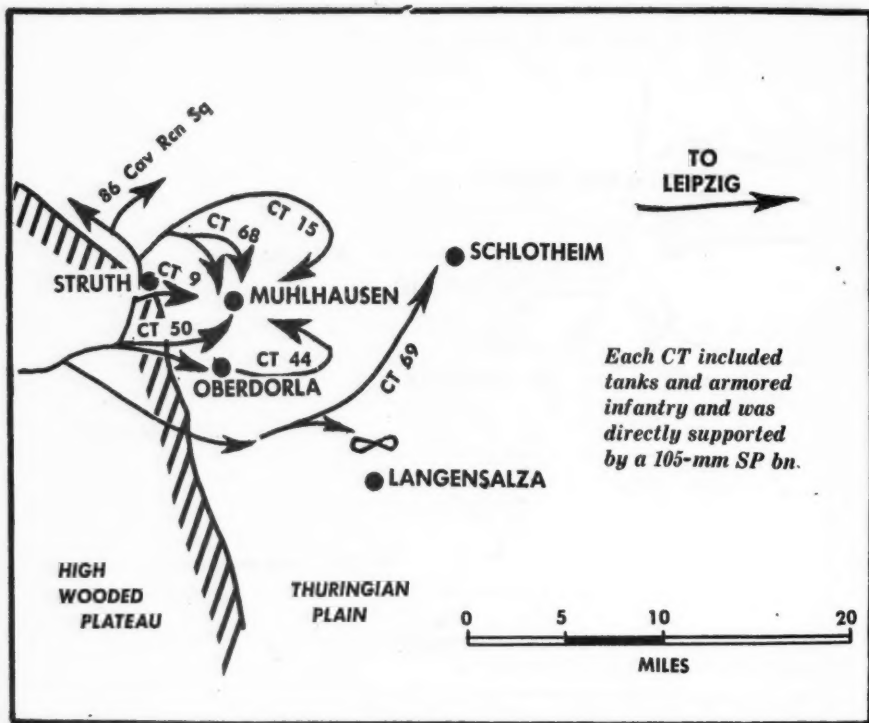
The picture as it appeared to us on the morning of 4 April is shown on Sketch 2.

Muhlhausen was known to be a city of about 50,000 and to contain certain important German government officers and officials. It was probably defended but it was important to prevent the escape of the government

officials. German resistance in the Bad Sooden area had been strong and the enemy was known to be in strength in the hills north of Eschwege. There had been no resistance at Gross Burschla, but Wanfried was held by the enemy. There were no friendly troops east of the river to the north of Bad Sooden,

strong counterattack northwest of Muhlhausen and was forced to throw all reserve troops into action to clear the pocket north of Eschwege and east of Bad Sooden, destroying a force of 1,500 Germans.)

For a few miles east of the Werra River the country is hilly and wooded, then just



Sketch 3.

and to the south we were out of contact with the 4th Armored Division which we knew was fighting for Eisennach about fifteen miles up the Werra River. Therefore the division was shooting into the open with neither flank covered and the north flank known to be threatened by rather strong forces.

(Parenthetically it is interesting to note that several days later, 7 April, before the First Army troops on the left came up, the division was struck on the left rear by a

west of Muhlhausen it breaks into the great Thuringian plain, as fine a maneuver ground as one can imagine.

The plan for 4 April was simple and is shown on Sketch 3.

While the 86th Cavalry Reconnaissance Squadron protected the exposed left rear, six combat teams poured out of the hills, deployed across the plain, swiftly knocked out all opposition and completely surrounded the objective. Combat Team 69, in the lead, had no op-

position until it neared the air field northwest of Langensalza. Here tanks laid direct fire at 2,000 yards on German planes frantically trying to take off amid April showers, an amazing sight. (Although the airport was by-passed at this time in order to continue the mission, it was secured the following day together with a number of practically undamaged planes.) The enemy was driven east of Schlothheim and the "back door" closed.

Combat Team 44 had stiff rifle and bazooka resistance in Oberdorla, south of Muhlhausen, and destroyed the town. The other four combat teams each encountered road block and light resistance, but all completed the investment of the city by dark with all exits blocked and patrols working into the suburbs.

At daylight 5 April Combat Teams 9, 50, and 44 quickly entered the city while Combat Teams 68 and 15 blocked and the 86th Cavalry Reconnaissance Squadron stretched east to extend a protective screen along the whole north flank. Prisoners totalled only about 2,000 which accounted for the lack of resistance in the city but some 285 members of the German Foreign Ministry with their records were taken.

Although the resistance actually encountered

was not serious, the enemy strength had been unknown and therefore the plan was designed to bring the full power of the division into action against a concentrated objective and at the same time provide ample security against the most dangerous outside threat, from the north (known, 20-mm and mortar fire north of Struth) and east (unknown). The problem was not only to capture Muhlhausen but to prevent the escape of important Nazis. Few, if any, escaped. Due to the fact that the division crossed the Werra River in one column, the development had to be successive. Therefore, CT 50 which was leading, initially blocked in the hills southwest and out of sight of the city, CT 69 next in column was given the long mission to Schlothheim, followed by CT 44. Units of CCA crossed the river in the order CT 15, CT 68 and CT 9 so that all closed in on the city simultaneously. The Reconnaissance Squadron crossed ahead of CCA to cover the flank.

After Langensalza was cleared on 5 April, the division established a line from south of that city, north through Schlothheim thence northwest and west which eventually extended forty miles before First Army troops came up on the north flank on 9-10 April.

The confidence of victory was based on three factors: the fighting quality of our men, the skill of our military leaders, and the superiority of our weapons. Nothing gives a soldier more confidence than the feeling that the weapon in his hand or the machine at his command is better than the best of his adversary. The American doughboy knew that his Garand was better than the rifle the Jap used. Our pilots knew there was nothing to equal the B-29 or the P-51 or any of the other models they flew. Our drivers knew that our jeeps, our tanks, our trucks, were the best in the world. The support that American industry gave our armed forces, in quantity and quality of weapons produced, will go down into history as the industrial miracle of the ages.

Hon. Robert P. Patterson, Secretary of War

The Functions of an Army G-1

COLONEL D. H. HUNDLEY, *Infantry*
Instructor, Command and Staff College

Introduction

STAFF procedure is similar in all headquarters. The greatest noticeable difference between a division staff and that of an army is the size.

In World War II, the G-1 section of a combat division generally had one or two officers while the same section in the Army had from six to twelve.

Size and Distance

The division staff officer is indeed fortunate if his plans can be well laid a week in advance. The Army Staff Officer should be making plans for a period from two weeks to two months in the future while still supervising the effects of yesterday's and last month's orders. The division staff frequently functioned efficiently with one staff meeting a day for as few as seven officers. On the other hand some members of the army staff had three coordination meetings a day and sometimes more. The first was for the assistant chiefs of sections and certain additional operating personnel. The second for the chiefs of section, liaison officers and supporting air units. There were from thirty to forty officers in each of these meetings. They might have been combined if there had been room, but security usually required that these briefings be held in a small but secure room. The third meeting, usually held later in the day, was the meeting of the Chiefs of General Staff sections with the Chief of Staff. Here each officer would discuss the high points of his section's activity during the day. An effort was made to select points of general interest to the other sections. This especially applied to anything effecting the change of a policy or that might show a trend requiring a change.

Once in a while the G-1 would call a meeting of some of the special staff for coordination on a problem or the announcement of a plan. Coordination with the G-2, -3 and -4 was constant. It was accomplished at the daily meetings, by a phone call, by an in-

formal discussion at meal time or a visit to their offices. A member of the G-1 section was seldom called in on a G-4 conference with the Special Staff because coordination had been effected informally by individuals of those sections before the meeting. In rare cases where some new point was presented, coordination was effected immediately after the meeting.

Work will be more efficient if the G-1 organizes his own section carefully. This organization must be flexible because the workload varies. No two armies used the same organization, but here is one that worked successfully:

Assistant Chief of Staff, G-1 (1 O, 1 EM)

Executive Officer (1 O, 1 EM)

Assistant to the G-1, coordinates and supervises the activities of the subsections. Assists in coordinating with other staff sections. Assumes duties of the chief of section in his absence.

Operations subsection (4 O, 5 EM)

Post war planning, war criminals, prisoners of war.

Civilian internment camps.

Allied POWs, repatriation.

Shelter, labor (civil and military).

Personnel charts and graphs, situation and operation maps.

Administrative order, coordinated with G-4.

Refugees, coordinated with Military Government.

Miscellaneous Subsection (3 O, 4 EM)

Reclassification, registration and relief policies.

Promotion, awards and decorations. Uniform regulations.

Activities of ARC, SSO, and AEO.

Policies on postal, finance, insurance, allotments, morale, rest areas, military justice, sanitation, and religious matters.

Policies on leaves, furloughs and passes.

Reinforcement Subsection (4 O, 5 EM)

Assignment and reassignment of officers and enlisted men.

Studies for changes in the T/O, Headquarters Organization.

Redeployment and readjustment, Military Government assignments and quotas.

Reinforcement policies and directives.

Supervises and forwards all reports including: G-1

Daily Summary, Station List, Weekly Report.

Personnel Gains Report, Campaign Casualty Reports and Studies.

Unit Reorganizing.

Graves registration, burials, effects and evacuation.

Administration Subsection (4 EM)

Maintain files and log all communications.

Keep an unbroken receipt system on Top Secret papers.

Keep section library of ARs and WD Cirs; furnish messengers.

The G-1 and Ex O had separate offices so each could hold private interviews and help solve individuals' problems without interfer-

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ence with each other. They each had stenographers who took notes on all important conversations during the day either over the phone or in the office. Frequently decisions were made in the conversation then typed and distributed for action by the subsections indicated. Each subsection kept a diary of the daily happenings which later became a part of the after action report. These diaries were carefully studied each evening by the Executive and the G-1 for correction and indication of the need for further action.

Policies

You have been told that the G-1 announces policies. Consider for sake of discussion one policy; the wearing of the uniform. The Chief of Staff has probably mentioned that he thinks the old uniform policy is out of date and requests you to revise it. From here on your action is no different than that of the Division G-1 except more people are affected by your decision. You would probably discuss a plan with your executive officer and the chief of your miscellaneous section. You would then require the latter to submit a suggested order to every member of the staff who could be even remotely interested in the effects of this order. It would also be advisable to check with varied unit commanders, Corps and other Army G-1s. The Adjutant General has probably had more experience with the wording of this type of order and knows where the pitfalls lie. The Provost Marshal knows what parts are most subject to violation. The Quartermaster can tell you what types of uniform are available for issue. Don't require ties when the Quartermaster can't get them. Unit commanders can give you gripes on the old order. There must be no privileged class indicated in this order or permitted to exist anywhere in the command. After completing this procedure send a draft of the proposed order to the Chief of Staff. This draft should be in such a form that the Chief of Staff needs only to initial it unless he finds some place where he desires to change the policy.

That is one way policies are formed. There are other ways. The Chief of Staff or com-

manding general might make a statement in the General Staff Conference that indicates a change in policy. If so, discuss the change there, if opportune, then write it out upon return to your office. Get the Chief of Staff's approval, distribute it to the staff and such units as should know about it. Place a retained copy of it in your policy file.

The Army G-1 supervises the writing of the personnel sections of the SOP. One is usually written for the operation of the headquarters alone, and another for the Army as a whole. Before you start these SOPs, study all other SOPs for form and contents. Look through the directives of the War Department, Theater and Army Group for necessary additions. Carefully consider your administrative problems now present and foreseen. Then search through your policy file for appropriate suggestions. In all of this an effort must be made to eliminate unnecessary items and prevent verbosity. If it is desired to refer to a War Department circular then state its number, date and paragraph, but do not reprint the entire circular. The SOP should be indexed to permit ready reference. After all of this has been carefully considered, then draft your idea as to what should go into the SOP and send this draft to each special staff officer concerned. The Adjutant General will be very interested in both SOPs and should offer a number of comments. The Headquarters Commandant will be particularly interested in that part of the Headquarters SOP that deals with the movement of the Headquarters. After all comments are returned a meeting of all members of the special staff, concerned with personnel, might be advisable. One meeting will probably take two weeks off the time needed to complete the work. These paragraphs are then submitted for consolidation with suggestions from other General Staff sections. It would be necessary for the G-1 to have one or more meeting with the G-2, -3 and -4, before either SOP is complete.

At this point it is appropriate to mention the G-1's relations with the Special Staff. It would be unintelligent not to consult each member of the Special and General Staff

about each problem on which they might have some knowledge. Those officers are selected for their assignment because they have had years of experience in their line. They are specialists of the highest type. Consultation on important subjects with the various staff members is usually done in writing and time will be saved if the paper is presented in this order:

(1) The Chief of Staff's directive to the G-1—or state the subject or purpose of the paper.

(2) The G-1's recommendations for a solution.

(3) Comments of other staff officers and request for further comment.

Trouble results from papers that are published without due consideration in this manner. All staff sections are equal under the commander. The Chief of Staff works more with his General Staff because he depends on them to coordinate staff problems, and it is easier to work with four men than twenty. If a Chief of Staff wants his G-1 to coordinate some unusual activity with Special Staff sections, then he should tell the Special Staff section concerned, as well as his G-1, about it and follow through. This is usually done and results in complete understanding and improved staff work.

Channels of Communication

There are two channels for communications in the Army; command and administrative. The command channel includes all headquarters but the administrative channel bypasses the Corps Headquarters for purely administrative matter such as requisitions for personnel. The advantage of the administrative channel is two-fold:

(1) It speeds the action on a paper.

(2) It reduces the amount of administrative work required of Corps.

When papers are sent from Division to Army through administrative channels it is normal to furnish the Corps with a copy. The command channel is used for all operational orders and for such administrative actions as deal with promotions, decorations and strength reports. Here each commander has

the opportunity to express his opinion. This channel fixes responsibility for each act in the chain. Some Corps wanted all papers to go through their Headquarters. However, the majority of Corps and Armies agreed that more efficiency was achieved if the administrative channel was extensively used and Corps were by-passed.

Reports and Adjustments

There are two reports that are of prime importance to the Army G-1:

(1) The G-1 Daily Summary.

(2) The Daily Replacement Depot report of strength available.

The first is submitted by all units through Corps and includes data on strength, battle casualties, nonbattle casualties, replacements received, returns to duty from hospitals, prisoners captured and evacuated. This report covers the twenty-four hour period just preceding. In most cases this covered the period to include midnight and was submitted in code by telephone at about 0200.

The second, replacement depot report, gave the figures on the replacements and return to duty personnel by branch and location.

By study of these two reports, over a period, the G-1 was able to determine the number of casualties to be expected in the next operation. He could then check with the replacement command to see if the number of replacements and hospital returnees expected were sufficient to offset that loss. If these were not sufficient, he should bring it to the Commanding General's attention and attempt to have the allotment increased by Army Group. The anticipation of casualties and steps to reduce these were a very important part of the G-1's duty in the European Theater.

Many people look upon the G-1 as a juggler of personnel. He constantly tries to place a square peg in a rectangular hole of approximately the same dimensions, but his efforts are thwarted in many cases by the inclination of commanders to turn loose of pegs that are neither round nor square. The perfectly round or square pegs are kept and carefully guarded by their units.

Another problem is the desire on the part of too many commanders to protect the inefficient. They report that a man has not done a good job for them, but he is just wonderful for someone else. This condition required the army to be strict in supervising all re-

is so senior as to require a policy. This worked out so that the G-1 usually handled the transfer and assignment of Colonels and General officers. The remaining officers and enlisted men were handled on a general policy basis by the Adjutant General who reported



Recuperating at the 34th Division Rehabilitation Center.

quests for reassignment or transfer to be certain that the commander was not unloading or dodging his responsibilities. This resulted in making it more difficult for each commander to get rid of the unfit. The original classification job was done by the Adjutant General for the Headquarters. He also supervised the subsequent changes. The G-1 should enter into this picture only when changes of policy occur, or the individual

his action to the Chief of Staff through the G-1. Almost half of the reclassification cases that came to Army Headquarters were reassigned in the army. Over ninety per cent of those reassigned made good on their new jobs. Reassignment in each case was not recommended until three steps had been taken:

- (1) The Adjutant General reviewed the case for administrative corrections.
- (2) The Judge Advocate reviewed it

from a legal angle to see if it was correct and fair. He also interviewed the individual.

(3) The G-1 reviewed it for a check on policy and in some cases interviewed the individual. If the case was not clear cut or gave indication of bias, then a reassignment was considered.

Law and Order

The Judge Advocate, Inspector General and the Provost Marshal, are available to advise the G-1 on problems relating to Law and Order. When approaching this problem it is well to remember that orders should not be issued if they cannot be enforced. Many armies had a problem in controlling traffic and uniforms. This was finally handled by posting signs throughout the area announcing the speed limit and fines for violating the uniform and traffic regulations. Traffic courts (from 4 to 12) were then established in the Army Area. The MPs would make the arrest when necessary and proceed to the nearest court for an immediate trial. If found guilty a fine was imposed and the soldier released. This speedy justice has a salutary effect on all types of discipline.

Shortly after entry of the Army into Germany, there was a sudden rise in so-called cases. Most of these cases later proved to be unfounded, but at the time they caused considerable worry in Army Headquarters. After consultation with the Special Staff and many commanders it was finally decided to enforce all minor disciplinary corrections more carefully, while appealing to the unit commanders for a closer supervision of their men. This treatment showed very satisfactory results in a very short period of time and emphasized again the importance of proper saluting, proper uniforms and regulated traffic, as indications of a unit's discipline.

The Army G-1 should recommend as few orders as possible on Law and Order, but when it is necessary to do so, the following points should be carefully checked:

- (1) Is it needed?
- (2) Does it apply equally to all grades and ranks?
- (3) Is it clearly worded?

(4) Is it distributed in time to accomplish its purpose?

(5) Is it posted where potential violators may see it before they disobey it?

(6) Have the unit commanders been apprised of their responsibility in explaining and enforcing it?

Morale

One of the greatest aids to morale was found in proper combat planning. The following three steps were used as a guide:

(1) Issue the Army Orders for attack in sufficient detail and far enough ahead so each squad leader would know his initial objective and the succeeding objectives after that. Include sufficient maps or air photos so each rifle platoon leader would have one in time for reconnaissance and proper planning.

(2) Push the attack as far as supplies, or the enemy would permit, then immediately go on the defense and relieve a large part of the combat force.

(3) Rest and rotate while resupplying and planning for the next push.

The result of this program was an increased confidence on the part of the men in the judgment of their leaders. Casualties were fewer and requisitions for replacements less, thus having the divisions better prepared for the next push by keeping a higher percentage of older men. The supervision of this program was primarily a responsibility of G-3. However, it was so closely connected with morale, replacement and rehabilitation problems that the G-1 would have been derelict in his duty if he had failed to call the G-3's or Army Commanders attention to a lapse in any part of it.

There are other staff officers, such as the G-2 by his public relations policy and the G-4 by maintaining a good supply system, who obviously have considerable affect on morale, but the G-1 is responsible for coordinating staff activities related to it. There is no other one individual on the staff who can report the condition of morale at all hours. Some officers have indicated that the special service officer or the chaplain is sup-

posed to have this information readily available. It is true that they do have information, but it is incomplete. The distance of the Army Headquarters from the front (from ten to thirty miles) makes it imperative that some member of the G-1 section get out of the office each day and visit a combat or service unit. A written report of this visit

some units, but the G-1 will have to consolidate some information about the morale of date these partial reports to get a complete picture.

A properly regulated replacement system was also a great aid to morale. All men returning to duty from the hospital and replacements report to the army through the



A furlough to the States. (Signal Corps photo.)

should be immediately sent to the chief of staff and any sections concerned. Any action required should be noted thereon. The G-1 should request that he be furnished a copy of the report of visits made by officers of other sections. He should ask Corps and Division G-1s to report corrections they consider necessary for morale or other purposes. Every special and general staff officer can

Army's Replacement Depot. The G-1 should make every effort to place the Depot and all its battalions in the best buildings available. Good kitchen and mess facilities, hot showers as well as comfortable barracks, are badly needed. The replacements have been moving so long by train, boat and truck, that they are in need of good food, a bath, and a bed. In many

cases the hospital returnees are still weak from their illness and also need consideration. One Army in Europe was particularly fortunate in its Replacement Depot Commander. He was a splendid executive and instilled a sincere interest for the welfare of the soldier in all of his officers. He asked and obtained permission for his personnel to wear the Army Shoulder Patch; although they were all assigned to the Com Zone. He placed pictures of the Army Commander and large copies of the patch where all incoming men could see them. Then, after the men had a good bath and a delicious meal, one of his officers would assemble them, give a short practical talk and usually end up by

saying, "You are in the ----- Army now, so your troubles are over." This supervision and care of the men was continued all the way to the division, where the Division Commander usually met and talked to them, then saw that they were properly cared for.

So far, this has been a discussion of only the staff part of morale. The greatest maker of morale in an army is its commander and the individual leaders under him. If some problem arises that staff action does not seem to correct, then go to the Commanding General with it, and recommend a line of personal action for him to take with his Corps and Division Commanders.

Our Mobilization Effort

The projected number of divisions [during the planning phase of our mobilization] was reduced to 90, including three special or "light" divisions that were being trained for jungle and mountain warfare. Later the 2d Cavalry Division, then in North Africa, was inactivated to provide urgently required service troops to support the amphibious landing in southern France. At the same time the Air Forces mobilization was fixed at 273 combat groups containing five heavy bombardment (B-29's and 32's), 96 heavy bombardment (Flying Fortresses and Liberators), 26 medium bombardment, 8 light bombardment, 87 fighter, 27 troop carrier, and 24 reconnaissance groups.

On the face of it this appeared to be a critically small ground force for a nation as large as ours. Germany with a prewar population of 80,000,000 was mobilizing 313 divisions. Japan was putting 120 in the field; Italy 70; Hungary 23; Rumania 17; Bulgaria 18. Among the major Allies, the Soviets had a program for more than 550 divisions; the British for more than 50; the Chinese more than 300, though their divisional strength was often little more than regimental according to our method of computation. We were, however, second of the Allies in the mobilization of men and women for military service, third among all the belligerent nations. The Soviet war effort was putting 22,000,000 men and women into the fight. By the time of their defeat, the Germans had mobilized 17,000,000. Our peak mobilization for the military services was 14,000,000. The British Empire mobilized 12,000,000; China 6,000,000.

This war brought an estimated total of 93,000,000 men and women of the Axis and United Nations into the conflict. And fortunately for us the great weight of numbers was on the side of the United Nations. Total Allied mobilization exceeded 62,000,000; total enemy mobilization 30,000,000. The figures show how heavily the United States was concentrating on aerial warfare, on the production and movement of arms for its own troops and those of its Allies, and the meaning in terms of manpower of waging war from 3,000 to 9,000 miles from our shores.

General of the Army George C. Marshall

Chemical Mortar Boats in the Pacific Ocean Areas

COLONEL GEORGE F. UNMACHT, *Chemical Warfare Service*

ONE of the most unusual uses of Army weapons during the war was the use of the Army's 4.2-inch chemical mortar as a Naval support weapon, for use in landing operations.

During the assault of landing beaches, there came a time when it was necessary to lift the fire of the naval guns, and support planes could no longer drop their bombs for fear of injuring friendly troops as they arrived at the landing beaches.

Considerable time was required before the artillery could move field pieces onto the beach and start firing at land targets, continuing where the naval guns were forced to leave off. The use of ship mounted 4.2-inch chemical mortars helped to fill this gap with gunfire that was both accurate and devastating.

Late in 1943, work was started by the Chemical Warfare Service in the Middle Pacific in cooperation with the Navy, to try the effectiveness of the mortar when mounted on support craft. The first of the landing support craft tested was the LCT (Landing Craft Tank).

The 4.2-inch chemical mortar had previously been experimented with in small landing craft of the LCV type, in the European theater. The initial idea was to run the mortars in to the beach, dismount them, emplace them on the beach and continue fire until the artillery could be landed, after which the mortars could continue their normal role of close infantry support.

Our idea was a distinct departure from this. We wanted to make the mortars an integral part of the armament of a small ship of slight draught, so that the ships could run in close to the shore, along with the landing waves and fire a rolling barrage

ahead of the infantry assault. The barrage could start at the water's edge and be "walked" inland a few hundred yards ahead of the infantry, thus sweeping a large percentage of the expected initial resistance into oblivion. Following the initial establish-



Close-up of mortar mount. (Signal Corps photo.)
Figure 1.

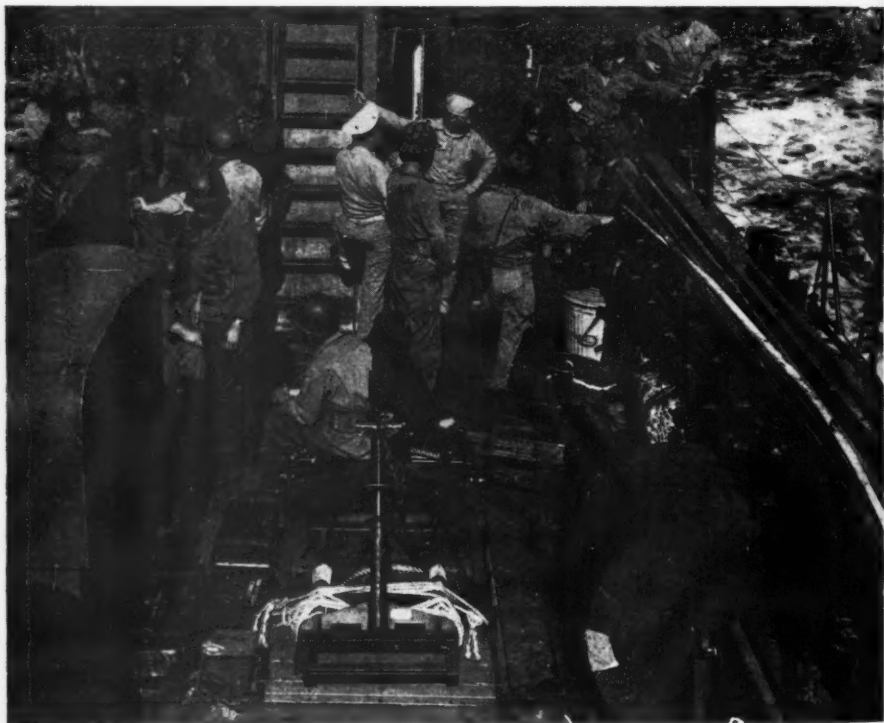
ment of the beachhead, the ships could stand by for call-fire missions, particularly for those missions in which the ordinary naval gunfire was relatively ineffective. Targets on the reverse slopes of hills could be particularly well handled because of the accuracy of fire and the high trajectory of the shell.

Naturally not all of these developments sprang full grown into existence, but by the end of hostilities a definite tactical doctrine for the employment of the floating mortars had been developed, and some of the action which built up the tactical usage follows.

The first step to successful mounting of the mortars in boats was in the development of a satisfactory mount. The 4.2-inch chemical mortar mount LC E2R2 was tested and modified to meet rigorous firing tests. This mount was essentially a reinforced box to which the standard of the mortar could be bolted. The box was filled with a mixture of

abreast in such a position that they would fire directly over the bow of the ship.

Initial tests with this type of mount and with the LCT showed very accurate fire was possible, and three ships were prepared for the assault on Saipan. Unfortunately, while returning to Pearl Harbor from a successful test of the ships, two of the mortar LCT's



Mortars emplaced on LCT. (Signal Corps photo.)

Figure 2.

sand and sawdust and the baseplate was seated on a wooden block which in turn rested on this mixture. A buffer was constructed at the back of the box to take the back lash of the mortar. (Figure 1.)

The mortars were mounted initially on LCT's. The width of the deck of the LCT permitted four of the mortars to be mounted

which were lashed to the parent LCT, were lost in an unusually heavy sea. This incident ruled out the possibility of use in the Saipan operation since new ships could not be made ready to meet the imminent mounting date. In preparation for later assaults, it was decided that a change in the type of craft would be desirable and the mortars

were mounted aboard LCI(L)s (Landing Craft Infantry, Large). When this mounting proved successful, the type of craft was redesignated as the LCI(M). It was found possible to mount three of these mortars on one of these craft. (Figure 2.) Although the range of the mortar can be varied either by change in elevation, or by change in the number of powder rings, it was decided that

1. *Laying a Rolling Barrage Moving at the Same Speed as that of the Ship* was effected by maintaining a constant number of powder rings on all shells. The firing was started at the water's edge and the desired rate of fire was maintained until the barrage had reached its farther limit. This procedure had the advantage that it could be used to precede the actual assault and

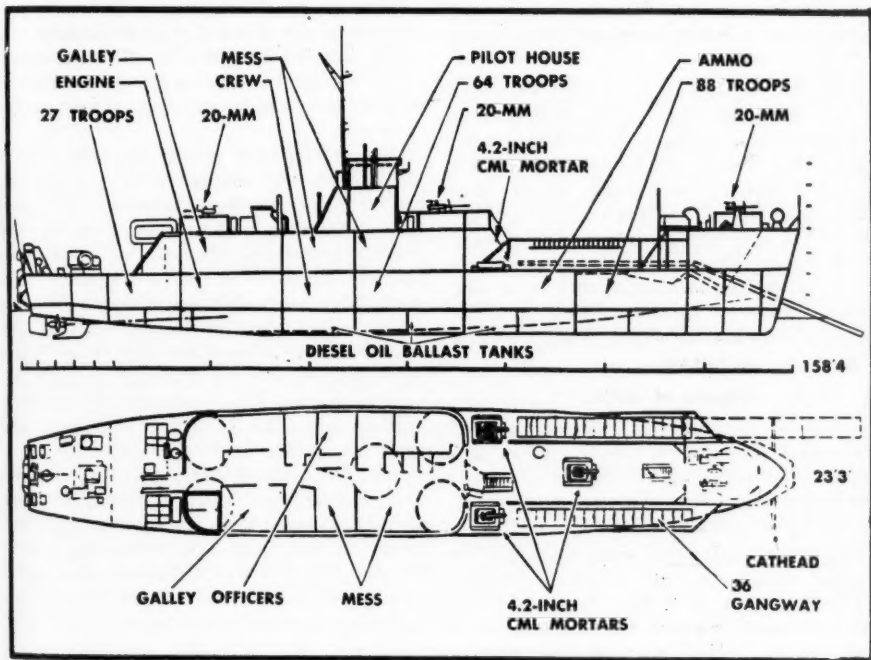


Diagram of LCI(M).

Figure 3.

the elevation would remain constant and changes in range would be obtained by variation in the number of powder rings, and by forward motion of the ship. The mortar was not traversed, but lateral dispersion was obtained by changing the direction of the ship.

Trial runs showed that the ship could be used very effectively in this way. Four different plans of fire were used in the different operations.

the barrage could be "walked" steadily inland, clearing the way for the assault forces.

2. *Laying Fire in a Limited Zone* was done by a series of rolling barrages using decreasing increments of powder rings so as to run through the area as in the previous case and then employ a lesser number of rings so that the firing was again started at the beach and rolled inland until the ship reached the limit of its course inshore. Firing tables were worked out which enabled

quick determination of the number of rings necessary for a given range.

3. *All Firing With the Ship Stopped* is not completely equivalent to land firing since a stopped ship cannot maintain heading and in consequence, moves backward and forward to maintain steerageway and swings to either side of the target. This results in greater dispersion of fire which is not a bad feature when area bombardment is underway but renders pinpoint firing more difficult.

4. *Single Successive Runs* were employed at Iwo Jima. The ships were used in a circle—successively running in toward shore, firing as they went. When they had reached a predetermined distance from shore, they swung out and took position at the end of the line as the next ship went in over the designated course. This method permitted steady fire to be kept on the target area for a long period of time, but did not have the devastating effect of mass fire obtained when several ships moved in abreast.

Reports of Action

The proof of the ultimate test of value of the mortar ships lay in use in combat, and they did not wait long before seeing action. The first group of four ships was made ready for the Palau invasion.

Thereafter, LCI(M)s were employed in landing operations at Peleliu, Anguar, Leyte, Lingayan Gulf, Iwo Jima and Okinawa. In each instance the value of such craft proved itself. The action at Anguar is indicative of this proof.

Action at Anguar

First run: 17 September 1944.—Firing was commenced at 2400 yards offshore while lying in the water. For seven minutes before heading toward the shore, each mortar fired approximately ten rounds per minute. Then for the next ten minutes, while moving in from 2,400 to 1,000 yards, each mortar was fired rapid fire, or approximately twenty rounds per minute. This latter fire was accomplished with varying charges so as to cover an area from the beach line to

300 yards inland. On rapid fire, after the first few rounds, smoke made observation practically impossible. In general, the fire was well placed with very few rounds hitting the water or outside of the beach boundaries. During this rapid fire period, approximately 240 rounds of high explosive shell were falling per minute on the beach area from the four ships of the group.

Second Run: 18 September 1944.—At 0600 the group was asked if it could be ready for a fire mission by 0800. At 0731 the target was designated as an area 900 yards long and 500-850 yards wide on the northwest end of Anguar.

Troops had been pinned down by snipers and machine-gun emplacements and had called for supporting fire. The plan was to have four ships move in abreast, open fire at 2,500 yards offshore and cease fire at 1,600 yards offshore. Ships were not to approach closer than 1,500 yards because of mine fields in shore waters. Two hundred rounds of ammunition were allotted per ship to be divided into three consecutive runs of sixty-six rounds each. Fire commenced at 0827, slightly less than 2,500 yards offshore, and ceased at 0833, 1,600 yards offshore.

At 1,600 yards offshore, two rounds at eight and one-half rings (range at 1,000 mils elevation, 1,595 yards) were fired by ship 740. These landed in the shore area when the rest of the barrage had swept beyond observation to a depth of 900 yards. These two rounds, which had been prepared in advance, fulfilled three purposes: (1) they assured the observer of the direction in which the barrage shells were fired; (2) they served to keep the enemy down after the barrage had rolled over them; (3) they gave the observer an additional check on radar ranges, which varied with the slope of the beach and the point at which trees gave back a reflection.

Since fire had to be completed by 0900, the second run was announced as the final run, and ammunition was doubled. Fire was opened at slightly less than 2,500 yards offshore at 0849, and ceased at 1,600 yards offshore at 0857. An indirect report from a patrol craft officer was received stating that

the troops were able to move in at 0900 without further opposition.

Conclusion

The 4.2-inch chemical mortar demonstrated its value as a support weapon for landing operations.

Comparing it to the rocket gunboat following the Philippines operation, Naval observers stated: (a) the LCI (Rocket) carried thirty-four launchers, each firing twelve 4.5-inch rockets, a total of 408 rockets. These were fired between 1,100 and 600 yards from the beach line and represented a three-minute concentration. Once they fired a three-minute salvo, they were through. No further rockets could be used to cover the assault waves for the landing, since time would not permit their re-loading; (b) each LCI (M) carried 1,200 4.2-inch HE mortar projectiles. These were fired from three 4.2-inch chemical mortars on each ship. They were fired at a slow rate of five rounds per gun per minute, and at this rate could fire indefinitely without overheating the gun. This means that 675 rounds could be fired from each ship in a forty-five minute barrage. For short periods, not exceeding about fifteen minutes, double this rate of fire could be sustained without damage. With a cooling system installed, the higher rate of ten rounds per gun can be maintained indefinitely; (c) the mortar ship can be used to fire

over friendly troops, due to its greater range and accuracy, while it would be dangerous to attempt this type of fire with the rocket ships; (d) LCI mortar ships are not confined in their use to support of the immediate landing. They are excellent artillery ships for firing into gullies and ravines which cannot be reached by other Naval gunfire support ships, and their usefulness continues long after the initial assault; (e) they can be used to cover the movement of assault boat waves from outside of reefs 2,000 yards or more offshore; (f) they may be used to provide casualty effect against night attack by use of both WP and HE shells.

The chemical mortar ships started out with a modest beginning in the Pacific Ocean Areas by joint action of the CWS Middle Pacific Officer and the CinCPac Gunnery Officer Captain Tom B. Hill, U. S. N. At that time, no use had been made of 4.2-inch mortars in the Pacific. Following the first amphibious demonstration, both Army and Navy personnel began to realize the capabilities of this weapon. The necessary facilities of Pearl Harbor were made available to do the machine work necessary in the early development. By this joint action the Army and the Navy together produced a weapon of great value in amphibious assault and a technique for its use, which can stand us in good stead if events again call for amphibious operations.

Whatever the form which any future war may take, we know that the men of our separate services will have to work together in many kinds of combinations for many purposes. The Pacific campaign of the recent war is an outstanding example of common and joint effort among land, sea and air forces. Despite its successes, that campaign proved that there is not adequate understanding among the officers and men of any service of the capabilities, the uses, the procedures and the limitations of the other services.

President Harry S. Truman

Intelligence in Heavy Bombardment

13th Bomber Command, Southwest Pacific

MAJOR GEORGE R. KAUFFMAN, *Air Corps*

Former Instructor, Command and Staff College

ALTHOUGH air operations in the Pacific followed generally the pattern in other theaters, there were essential differences in

target together with shipbuilding facilities. The island hopping tactics also meant heavy bombardment had to be used to soften the



B-24's strafe Japanese shipping. (U.S. AAF photo.)

the type of targets. Heavy bombardment was employed as a striking force according to the following priority: (1) aircraft on the ground, (2) runways, (3) supply, (4) personnel. Strategic targets were nonexistent with the exception of oil refineries at Balikpapan and Lutong, Borneo, and oil storage at Tarakan. Shipping always was a prime

beachhead and support the ground troops after invasion. Because of long range, planes had to fly from their bases to the scene of the landing.

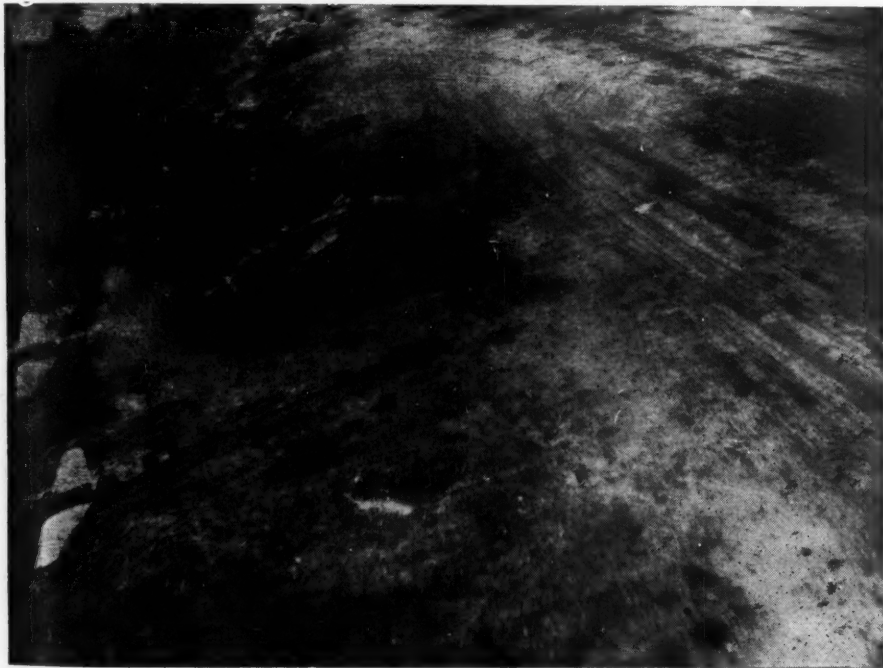
Aircraft on the Ground

Aircraft was the primary offensive weapon of the enemy in the South and Southwest

Pacific. To destroy his aircraft, therefore, became the first consideration in waging the war to a successful conclusion. As long as his aircraft could fly, our bases were not safe, and targets could not be attacked without excessive losses unless fighter protection was obtainable. Fighter escort was not possible in many instances because of the long range and lack of sufficient fighters. The

check of aircraft on the ground could we keep track of the enemy aircraft activity. In each area there was generally only one mission where many aircraft were caught on the ground and destroyed. This was due to surprise alone.

The Japanese followed the general plan of placing all their aircraft in one dispersal section. Photos would indicate which one.



Destruction of Japanese planes on the ground. (U.S. AAF photo.)

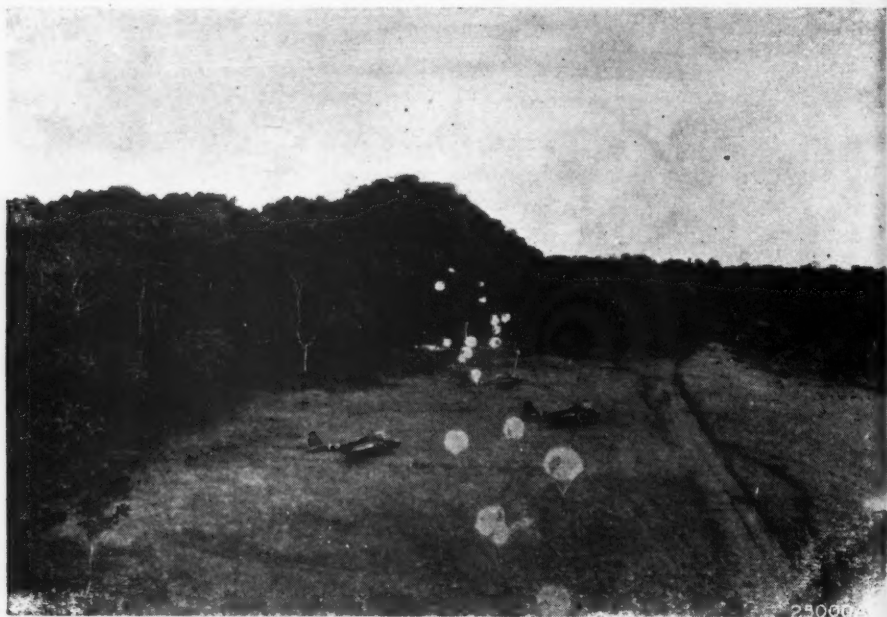
first target in a new area was always aircraft on the ground at the airdrome. In the Solomons, at Rabaul, at Truk and other mandated islands, in New Guinea, in the Halmaheras, in the Philippines and in Borneo there were always two or more airdromes within the immediate target area. It was then easy for the Japs to move aircraft from one airdrome to another. Only by continually hitting the dispersal areas and keeping close

Often we were able to achieve great success even though there was no up-to-date photos, as old photos showed the general location and that was enough until the enemy was down to ten or fifteen aircraft. Deception was then practiced by the enemy by placing serviceable aircraft among wrecks, camouflaging them with palm fronds and hiding aircraft among the trees and along highways. It was then that the job of ferreting

serviceable aircraft became difficult. Often photos would not show up the aircraft. In every instance where dummy aircraft was found, there were no serviceable aircraft. Ground information from the Philippines was often used to discover hidden aircraft and, although many more were reported than found, this information led to some profitable ends. Our success against aircraft on the

dropping fragmentation bombs through the most likely dispersal area. The recognized target area was 1700 feet by 900 feet but this was often extended to cover a dispersal area as large as 2500 feet by 1500 feet.

When the large numbers of aircraft disappeared, B-25s, P-38s and P-47s were used to strafe and bomb isolated hideouts, provided they were within range of these planes.



Parafrag bombs land in a Japanese dispersal area. (U.S. AAF photo.)

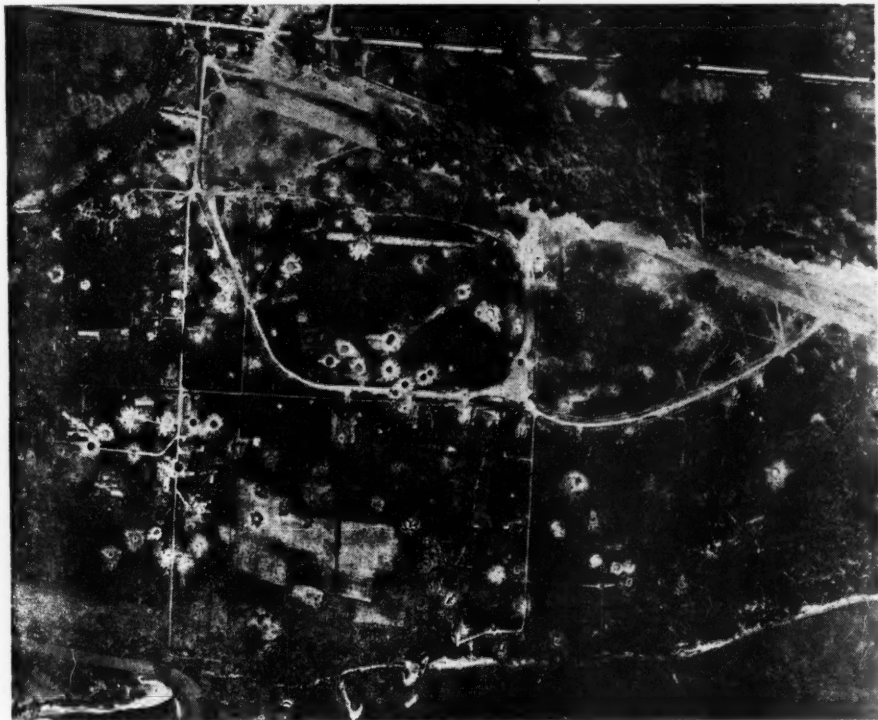
ground then depended on ground information, first to locate the general area, such as hideouts along highways, and second photography to locate the hideouts definitely. Although not all serviceable aircraft were destroyed, they were made inoperative by other means, such as cratering the runways and destroying the fuel supply.

First strikes were conducted by B-24s in a group combat box (twenty-four planes)

The B-24s, bombing from high and medium altitude, used photos showing the dispersal area in relation to the runway. There was no difficulty in providing the proper photos for these missions. The mediums and fighters, however, going in "on the deck" had difficulty in finding the hideouts because the proper photos were not available. Often the only available guide for these missions was a sketch of the area and reproduced in quan-

tity by our photo laboratory. Also of use were photographs of the general area on a 1:15,000 or 1:20,000 scale showing orientation points. Obliques taken at tree top to 500 feet on the axis of approach would have been the solution of the problem, but only in rare instances was this possible because of lack of aircraft and photographic material.

hours. Of course, many runways were continually cratered and when there were no more aircraft using the runway, it was abandoned as a target. However, even when the runways were not used, the Japanese kept them in fair shape and there were many that had at least 1000 feet to 1200 feet still serviceable. Also when a runway was cratered



U.S. bombs obliterate Japanese runways, Philippine Islands. (U.S. AAF photo.)

Runways

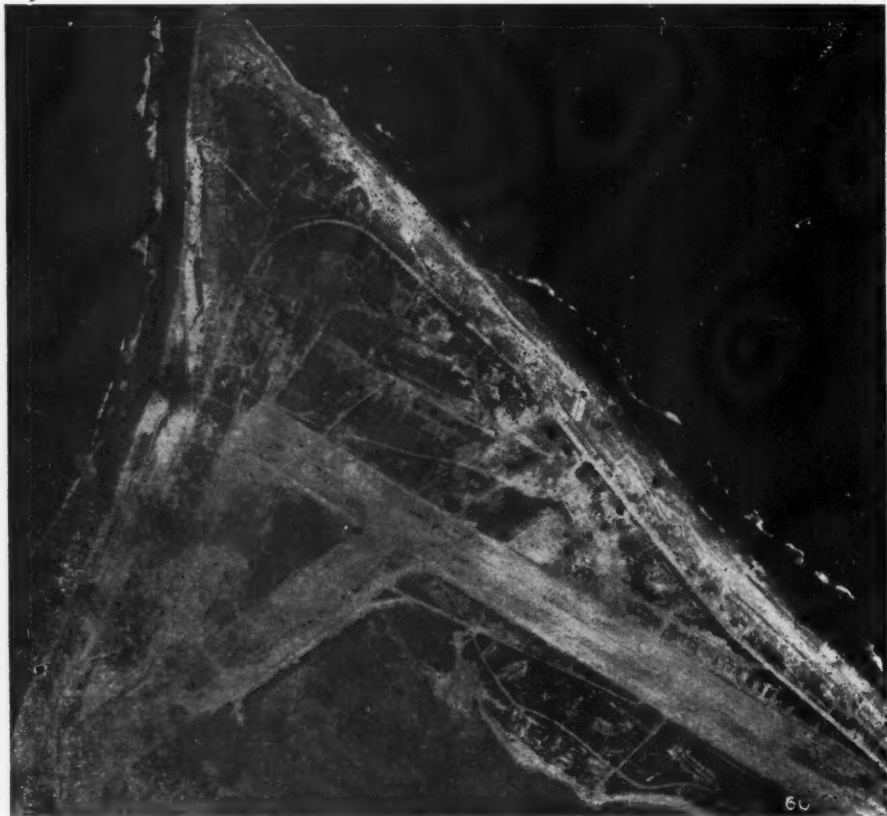
Cratering of runways has not paid off in the Southwest Pacific area except in one case: Where an airdrome must be neutralized for no longer than two days either in connection with a landing, or an attack on an important target within the area. Craters were continually filled, however, and an airdrome was seldom out for longer than twelve

beyond filling, a new runway would be made by widening a stretch of straight road in the vicinity. In most instances coral was available for surfacing material and, often the "Nip WPA project" went on filling craters in the hope that a plane might come in. Dummy craters were constructed on the serviceable portion of the runway. They were made out of palm fronds laid upon a dough-

nut shaped frame. They were easy to identify in aerial photos, and as in the case of dummy aircraft, dummy craters were never used until there was no hope of using the runway; and when they appeared, it was almost

landing that in some instances even our own engineers could not put them into first class shape.

Runway targets were selected according to status obtained by photo interpretation,



A Japanese airfield. (U.S. AAF photo.)

safe to count the airdrome as abandoned.

After destroying most of the aircraft in the area, it was often necessary also to neutralize the airdrome by craters to protect an invasion or a friendly convoy route. This paid dividends as the runways were often so unserviceable by the time of the

activity of aircraft and amount of facilities at the base. Often our photos were not up-to-date and it became necessary to send our strike planes to re-photograph the airdromes. This was also necessary in the case of distant airdromes which F5's (photo reconnaissance planes) could not reach. The target

section kept a running account of aircraft and serviceability of the runway in a large book, plus a small board upon which the status was kept. If A-3 wanted to know airdrome status, the board with everything on it could be taken to the A-3 office. It saved many trips and many mistakes.

The target size varied with the size of the serviceable portion of the runway and number of aircraft employed.

Single plane strikes were often made on runways as secondary targets to shipping strikes. In these instances the target area was the entire serviceable portion and when no heavy antiaircraft fire was expected, runs were made at altitudes as low as 4000 feet and down the long axis of the target.

Supply Areas

The third priority target was supply areas. With the Jap supply lines out, supplies for their isolated bases came only in dribblets. This meant that each destructive strike against existing supplies lessened the enemy's ability to wage war. Of primary importance was the supply of fuel for Jap aircraft. Although many runways were serviceable and they had aircraft, the lack of fuel curtailed operations. Fuel was generally hidden among the coconut trees, well camouflaged and hard to hit. Ground information supported by photos were the only means of locating these supply points. B-24s and B-25s were used to destroy the supplies. Generally the only means of damage assessment was a bomb plot showing complete saturation of the area and a few fires. Confirmation of damage came from ground information.

Personnel Areas

Japanese personnel was the last priority target for heavy and medium bombers. The Japs were difficult to find and difficult to kill. Only in rare instances were personnel areas used as targets. In these cases, often the first three priority targets were destroyed, and large concentrations of troops were known. Again ground information was the chief source of information both for finding and assessing damage to personnel.

Strategic Bombardment

Due to the locale of the Thirteenth Air Force operations, strategic targets were non-existent until Balikpapan, Borneo, with its oil refineries, came within range. This was the one and only strategic target attacked by our bombers.

The importance of the target, as far as Jap shipping and aircraft fuel supply was concerned, made this a juicy plum. The targets within the refinery were selected according to the established rules of what is necessary to knock out a refinery. Our force was small—two heavy bomb groups, later augmented by three heavy bomb groups from the Fifth Air Force—and it was known that only a few strikes could be made due to other commitments. The power plant of each of the five refineries was the primary target. They were located by photo interpreters and information was obtained from a Dutch liaison officer who had been general manager of the Lube Oil Refinery at Balikpapan. Because of many fighters, intense and accurate antiaircraft fire and cloud cover at the target, strike photos were often limited. And because of the range, photo reconnaissance was practically nonexistent. Damage assessment here was, however, made from strike photos.

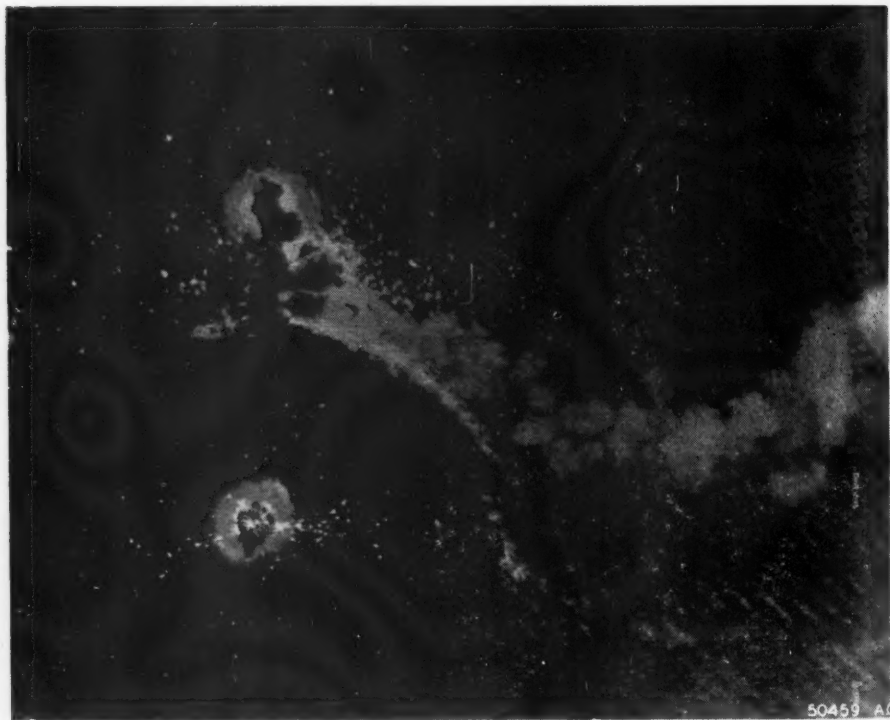
Initial information for the Balikpapan strikes was meager. Photos taken a month before the strikes were the only available coverage. On the first strike, fighters came off of a new strip seven miles northeast of Balikpapan that was unknown up to that time. The number of fighters to expect was an unknown factor as was an accurate count of antiaircraft guns. Although much preparation of materials and plans was made, information was lacking. Much was learned, however, from the first strike that was used in subsequent strikes.

Other strategic targets included the Tarakan Oil Refinery and storage tank area, and the Lutong Refinery on the West Coast of Borneo at Miri. An all out strike utilizing P-38s, B-25s and B-24s was made against

Tarakan. For this strike ample information was available because we were closer to the target than we had been when we started hitting Balikpapan, and photos were available.

Lutong was a different story. This was one of the first "Zoot Missions" planned for the 868th Bomb Squadron (Snoopers). Single plane, low level attacks were made on four

neo, were targets for small elements of heavy bombers. Usually they were attacked as secondary targets to shipping searches. In some instances, such as the Kuching, Pontianak and Samarinda yards, they were primary targets for a group formation. Much damage was done to these yards and it led to the near extinction of small shipping. Although



Aerial bombs strike Japanese freighter. (U.S. AAF photo.)

consecutive days. Coming in "on the deck" to achieve surprise, strafing the area and dropping bombs in the refinery achieved the same results as one group could have done. The refinery was put out of commission and oil storage tanks were destroyed.

Small ship building yards, mainly in Bor-

the major ship building yards were well known and there was plenty of information on them, the isolated yards were found and destroyed by enterprising crews who found them, photographed them and then later hit them. Activity in these yards was measured by keeping close check by continuous photo-

graphy—strike photos being used in the majority of cases.

Ground Forces Targets

There were generally two types of targets which can be included under this heading—those targets which were hit prior to an invasion and those targets hit in direct support of the ground forces after a landing.

The pre-invasion of indirect support targets were generally of the softening-up type. Beachheads and supply and personnel areas had to be saturated. Where there were heavy concentrations of anti-aircraft and coastal defense guns, these were primary targets, first to reduce the anti-aircraft fire so later air strikes could operate at lower altitudes and with better accuracy; and second, because these guns could also be used against ground and water-borne targets. The supply and personnel areas were well dug in and difficult to find by the time the date for an invasion was set. Photo interpretation and ground information played the most important role in the destruction of these areas. The best example of what heavy bombardment can do to anti-aircraft and coastal defenses was Balikpapan. By systematic, precision bombing with sixty pound fragmentation bombs and one thousand pound, general purpose bombs all guns were rendered ineffective.

It is also a case in point for personnel and supply areas. They were eliminated also. Photo interpretation was so accurate that we knew at all times what guns were still operational and what supply and personnel areas were still important to the enemy. Invariably, an invasion was preceded by beach bombing. This began at H-hour minus one, and continued until the landing craft were ready to come in. Its success can be measured

by the fact that in every case the landings were made with no, or only slight, opposition. The enemy was not encountered until after the beachhead had been established and supplies had been brought ashore.

The post-invasion strikes were carried out



An island airfield feels U.S. bombs. (U.S. AAF photo.)

at the direction of the ground forces. Ordinarily a message would be received twenty-four hours before the strike time giving the target, its dimensions, its composition, ground force lines, bombing line, type of bombs, number of anti-aircraft to be used, location of Controller, axis of attack, time of attack, and means of identifying target which was usually by smoke shells. The targets were often changed to keep up with the ground troops either by radio, or when the formation leader checked in with the Controller at the target. This caused some confusion because of briefings, but never interfered

with results obtained as the crews were thoroughly briefed in procedure, and change in target meant only finding the new objective on a gridded 1:25,000 map of the area. The direct support of ground troops in this theater was difficult because of the terrain. Invariably the Japanese would dig in on the top of a hill and it was not only difficult to find the hill in a dense jungle but also difficult to cause great damage to such dug in positions. Another factor was the morale of the crews. They liked to see damage resulting from their bombing, but jungle prevents seeing such results. The

only method of determining results was ground forces information after they had taken the position. Morale was raised by messages from the Controller reporting a good job, or from ground force headquarters to the effect that the position was occupied a few minutes after the bombing with few or no casualties, and that they found many enemy dead. The bombing of Tarakan and Balikpapan was so accurate that the veteran Australian ground troops would not move back from their lines to give the bombers more than 200 yards safe area in which to bomb.

We must start, I think with a correction of the tragic misunderstanding that a security policy is a war policy. War has been defined by a people who have thought a lot about it—the Germans. They have started most of the recent ones. The German soldier-philosopher Clausewitz described war as a special violent form of political action. Frederick of Prussia, who left Germany the belligerent legacy which has now destroyed her, viewed war as a device to enforce his will whether he was right or wrong. He held that with an invincible offensive military force he could win any political argument. That is the doctrine Hitler carried to the verge of complete success. It is the doctrine of Japan. It is a criminal doctrine, and like other forms of crime, it has cropped up again and again since man began to live with his neighbors in communities and nations. There has long been an effort to outlaw war for exactly the same reason that man has outlawed murder. But the law prohibiting murder does not of itself prevent murder. It must be enforced. The enforcing power, however, must be maintained on a strictly democratic basis. There must not be a large standing army subject to the behest of a group of schemers. The citizen-soldier is the guarantee against such a misuse of power.

General of the Army George C. Marshall

Assault Operations Against Japanese Cave Positions

MAJOR GENERAL RAPP BRUSH, *United States Army*

THE 40th Infantry Division in its drive down the Luzon Plain toward Manila met an elaborate system of defenses in the foothills of the Zambales Mountains to the west of Fort Stotsenburg.

These foothills were found to be honeycombed with an elaborate defensive system consisting of caves, tunnels, automatic weapons positions, and fire trenches. The caves probably were prepared for storage and troop bivouacs, but the enemy became expert in using them as firing positions for the troops defending the terrain features on which they had been constructed. These caves proved to be formidable obstacles to the advancing infantry and painstaking effort and ingenuity were required before they were neutralized and destroyed.

Cave Construction

In designing these positions the enemy displayed exceptional tactical ingenuity. Dominant terrain features were organized so that each prominent hill mass constituted a self-sustaining fortress provided with defenses in depth and mutually supporting fires. Both forward and reverse slopes were utilized and cave positions on the same level were connected by inner communication tunnels. Work could be conducted on positions dug into the sheer, steep cliffs from catwalks which were constructed along the face of the cliff. These catwalks extended down the face of the cliff and connected other catwalks on lower levels thereby providing a means of movement from one level of caves to another (Figure 1).

These cave positions were dug into the hill as deep as seventy feet. The communication tunnels which extended laterally, connecting caves of the same level, in many instances were so small that one would have to crawl to make use of them. Others were large enough to allow a normal size man to walk upright. Practically all caves were provided with dead end offsets which enabled the enemy to stay near the firing position

at the mouth of the cave and yet have maximum protection against projectiles entering the position. Although some of the caves had nothing but camouflage nets and painted canvass over the opening, some were constructed with an earth parapet to provide both camouflage and protection at the cave opening.

In a few instances, supporting timbers were used to strengthen the caves but due to the high plasticity clay and the volcanic rock, additional supports were usually unnecessary. In all cases these positions were well camouflaged by combining natural and artificial means.

Reduction of these Positions

A successful method of reducing these enemy cave positions was found by attacking them with an organization known as an Assault Team. While the composition of these teams varied, in most cases they consisted of an eight man assault group and a six man covering group organized and equipped generally as follows:

Assault Group	Arms and Equipment
Two-man Flame Thrower Team.	One flame thrower and refill.
Two-man Demolition Team.	Crater charges, pick and shovel, forty feet of W-110 wire, electric caps, friction tape, wire cutters, fifty feet of $\frac{1}{2}$ " rope, and a BASS.
Four-man Close Support Team.	Submachine gun, twelve WP grenades.
Covering Group	
Four riflemen.	Cal .30 M-1 rifle.
Two BAR men.	Browning Automatic Rifle.

With movement canalized by the steep slopes and with the enemy in excellent observation positions, the close approach to each position required careful reconnaissance, extreme caution in movement making full use of available cover and concealment, and well coordinated supporting fires.

A base of automatic fire was first established on commanding terrain held by friendly troops. Under this fire the assault

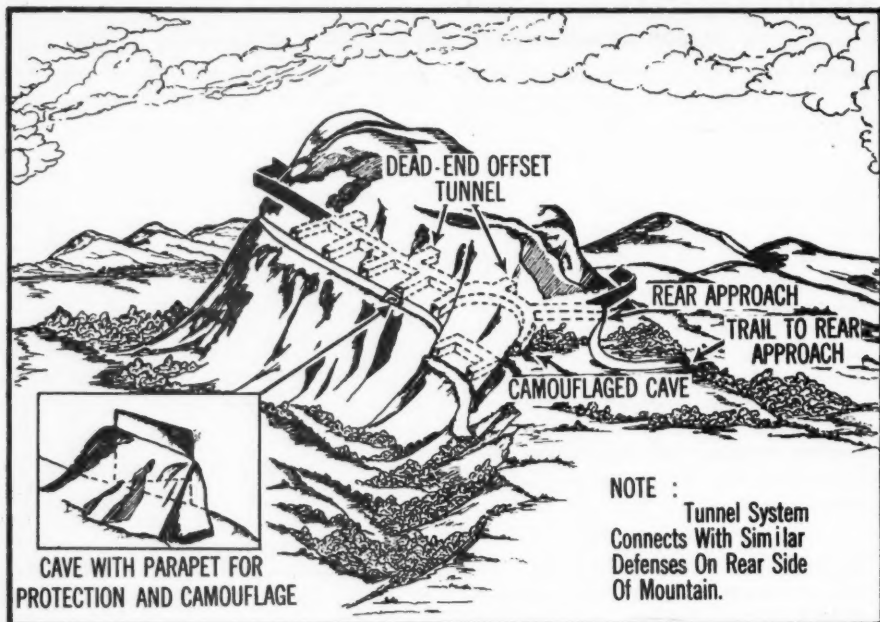


Figure 1.

team made its approach toward the enemy position. When the assault team came into the danger area of the long range supporting fires, a red panel was displayed as a signal to cease fire. At this time the covering group of the assault team took the enemy positions under fire as the assault group continued to advance and maneuvered to a position from which to attack the target enemy cave (Figure 2). When the assault group was in range, WP grenades were thrown inside. Then covered by the resulting smoke and the close support team, armed with submachine guns, the flame thrower team advanced directly to the entrance of the cave and expended its entire load. Simultaneously, the demolition team approached the position from above; a trench was dug approximately eighteen inches deep and wide enough to allow the insertion of a crater charge as near the center of the position as possible; the charge was then lowered into the trench. After being securely

tamped and packed, W-110 wire was strung back to a covered position preparatory to detonating the charge. On a prearranged signal all members of the team within the danger area withdrew to a covered position and the charge was then detonated by the use of a battery BA-38. In ninety per cent of the cases the explosion successfully neutralized the position. Each adjacent cave position was approached one by one and neutralized in the above manner.

In those instances where the location of the cave precluded demolition teams approaching the top of the cave mouth, charges were placed in the entrance of the cave and along the cat-walk approaches. This method destroyed the cave entrance approached to the position. Thus, for the enemy to reoccupy such a cave they would first have to reconstruct a cat-walk up the steep slope and then evacuate the cave entrance.

Use of Smoke.—WP grenades and shells were successfully employed to cover the ad-

vance of assault teams and materially assisted in driving the enemy from positions so that the covering riflemen could dispose of them. In addition smoke from grenades or shells penetrating the entrance of one cave would spread through the communication tunnels and disclose other cave entrances which had been undetected. Smoke also served to display exactly which caves were interconnected.

Cooperation with Direct Fire Weapons—M-7s, SP 105-mm How, 90-mm AA Guns, 155-mm How, and TD 3" Guns.—Direct fire weapons were frequently used to support assault teams when the enemy cave was at a range too great for small arms. When this was true, direct fire weapons took the main positions under fire until the covering group could get within effective range. At that time the direct fire weapons ceased firing on the cave under assault and directed fire on flanking caves capable of interfering with the assault team.

In some instances the rugged terrain made it necessary for the enemy caves to be neutralized by the use of direct fire weapons only. It must be stated, however, that such a method was only a partial answer to the problem since these weapons were found to be incapable of completely destroying such positions. By firing a smoke round into the caves and observing the extent of the inter-communication with adjacent caves, the power of several direct fire weapons could be brought to bear on all caves so connected, thus denying the enemy the use of any one cave for counter-fire. Although this method neutralized the enemy positions and allowed the advancing infantry to move forward, it in no way insured the destruction of all enemy personnel within the caves. Continued surveillance of these positions was required with direct fire weapons standing by, to conduct "Pistol Pete" missions against enemy personnel when they again showed themselves at the mouth of the cave. Eventually

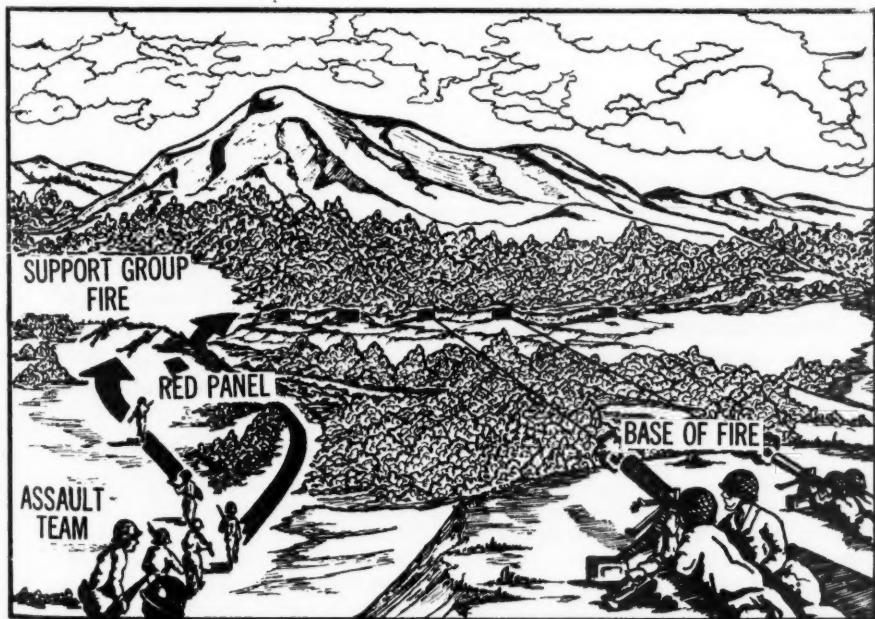


Figure 2.

assault teams would reach the position by working through communicating tunnels or by creeping up cat-walks, sometimes from the reverse slopes, and the positions were then reduced in the manner explained above.

Reoccupation of the Position by the Enemy

In the early stages the Japanese would infiltrate through our lines and reoccupy cave positions which had already been neutralized, by digging out entrances and re-establishing weapons therein. This action on the part of the enemy was prevented by the complete destruction of these cave positions by engineer demolition crews.

Engineer Demolition Teams

When the enemy cave position was accessible to heavy equipment, holes were drilled with compressors, using rock drills, in the cave roof and sides and dynamite

charges placed therein. The use of enemy aerial bombs in cave entrances or on the slopes of the hill directly above the entrance proved exceptionally successful in the complete destruction of these positions. However, in most instances the rugged terrain precluded the use of heavy engineer equipment. Where positions were inaccessible, demolition crews handcarried composition "C" and pioneer equipment up the slopes to the cave entrances, destroyed the positions individually at any given level, and then prepared the cat-walks for destruction, withdrawing before detonating them. This method was slow and tedious and, in some instances, did not completely destroy the cave; it was successful however, in that the enemy was denied a means of approach to any given level of caves because of the destruction of the cat-walks.

I fear that we expect too much of machines. We fail to realize two things: First, that the finest plane or tank or gun in the world is literally worthless without technicians trained as soldiers—hardened, seasoned, and highly disciplined to maintain and operate it; and second, that success in combat depends primarily upon the development of the trained combat team composed of all arms. This battle team is the most difficult, the the most complicated of all teams to create, because it must operate on unknown ground, in darkness as well as in daylight, midst incredible confusion, danger, hardship, and discouragement. It is a team of many parts, the decisive element of which remains the same little advertised, hard-bitten infantry soldier with his artillery support.

General of the Army George C. Marshall

The United States General Staff, its Evolution: an Epitome

MAJOR HENRY B. WEBB, *Medical Administrative Corps*

MODERN armies are not dissimilar in many respects to modern business with its numerous central and branch offices. To run either effectively and efficiently requires the application of the science of organization; further, the development of problems in the military establishment is neither more nor less remarkable than the development of similar problems in business. Both require and utilize a staff, as has been shown by Brigadier General Pence and Lieutenant Colonel Brownell in their review entitled "Types of Staff Organization Found in the United States Military Forces." The *Staff Officers' Field Manual* of the United States Army defines the staff in these words: "The staff of a unit consists of the officers who assist the Commander in his exercise of command."

It may not always be possible, in studying the historical evolution of the staff, to distinguish between general staff development and General Staff. "Although an understanding of the basic meaning of General Staff is not particularly involved," it will be recalled that "two types of staffs, one composed of the group of officers who formulate the plans for the nation's military policy, and another group consisting of those who function as the assistants, or staff of field commanders," are common to military forces.

It is the purpose of this discussion to epitomize the evolution of the General Staff, United States Army, and not the development of general staff history. It will, however, be realized that the staff system, generally, and the General Staff in evidence today, are the products of evolution and revolution of aeons of written and unwritten military history, some of which may well be conjectural.

On 15 June 1775 the Continental Congress elected George Washington "to command all the Continental forces, raised or to be raised,

for the defense of American liberty." On 16 June the Congress came forward with legislation providing for an adjutant general, quartermaster general, paymaster general, commissary general of stores and provisions, commissary general of musters, and a chief of engineers.

On 17 June 1775, Brigadier General Horatio Gates assumed office as adjutant general; on the same date Colonel Richard Gridley assumed office as chief engineer; on 27 July James Warren assumed office as paymaster general; on 11 August Stephen Moyan assumed office as commissary of musters; on 14 August Major General Thomas Mifflin assumed office as quartermaster general; and on 17 August Ezekiel Cheever assumed office as commissary of artillery stores. Dr. Benjamin Church assumed office as director general and chief physician of the Medical Department on 27 July, and on 29 July Lieutenant Colonel William Tudor was appointed as judge advocate general. There were other appointments as staff officers from time to time during the ensuing few years, and it should be noted that the Act of 16 June 1775 established only a basis for a staff organization, the pattern which followed closely upon the British staff system of the time. There is scant evidence in the record that the nucleus of a staff brought into being at this time functioned as a staff.

On 13 June 1776 the Congress created another agency to aid in the administration and prosecution of the war—the Board of War—the forerunner of our present War Department. "Although the foundation of the War Board was of historic importance in the eventual evolution of the General Staff, it was of little immediate value to Washington, as there is no indication that it materially relieved him of administrative matters."

This, and other manifest wants, led to the creation in July 1777 of the office of

inspector general, although the first two incumbents, Colonel Mattin de la Balme and Major General du Coudray, held office under the titles of inspector general of cavalry and inspector general of ordnance and military stores, respectively. On 5 May 1778, Baron Frederick von Steuben was appointed as inspector general following the unfortunate tenure of Major General Conway. Baron von Steuben, a product of the staff system developed by Frederick the Great and the Prussian military educational school was, therefore, the first trained staff officer of the embryo United States Staff. So thorough were the staff doctrines and duties of von Steuben as enunciated in his "Estimates of the Situation," that one military biographer suggested the composition of Washington's Staff, in modern terminology, might read:

Chief of the General Staff: Major General Baron von Steuben

Asst. Chief of Staff, G-1, Personnel: Major General Baron von Steuben

Asst. Chief of Staff, G-2, Intelligence: Major General Baron von Steuben

Asst. Chief of Staff, G-3, Operations: Major General Baron von Steuben

Asst. Chief of Staff, G-4, Supply: Major General Baron von Steuben.

Naturally enough, the existing staff designations saw many changes, though many valuable suggestions for a more competent and efficient staff fell upon fallow ground. Without doubt such conditions were the basis in fact for Washington's statement that "the appointment of general officers is *important*, but those of the general staff *all-important*."

In 1809 William Duane published a compilation in "The American Military Library" of prevailing military doctrine, including the latest in staff doctrine of the Armies of Napoleon. However, there is little to indicate that the military minds took advantage of this work. Thus we entered the War of 1812 with little and inefficient staff functioning. Nor did this condition improve in subsequent years; for in 1836 the regulations vaguely defined the staff in these terms:

"The General Staff comprises all the officers concerned in regulating the details of the service and furnishing the army with the means necessary for its subsistence, confort, mobility and action."

Nor had we profited when in 1855 Jefferson Davis, then secretary of war, appointed a commission of three officers including George B. McClellan, later Commander of the Army of the Potomac, to study Prussian staff methods being used in the Crimea. In the voluminous report published by the commission in 1861, no mention was made of the Prussian staff. Army regulations of 1861 provided a staff organization essentially the same as previous staff organization and doctrine. Paradoxically, McClellan as Commander of the Army of the Potomac, declared that "one of the greatest defects of our military system is the lack of a thoroughly instructed Staff Corps, from which should be furnished chief of staff for armies, army corps, and divisions, adjutant general, and aides-de-camp and recruiting officers. Perhaps the greatest difficulty that I encountered in the work of creating the Army of the Potomac arose from the scarcity of thoroughly instructed staff officers, and I must frankly state that every day I myself felt the disadvantages under which I personally labored from the want of that thorough theoretical and practical education received by the officers of the German General Staff."

Inspired in the main by the writings of Jomini, Napoleon's chief of staff, General T. M. Vincent, assistant adjutant general in 1870, published a treatise "A Plea for the Staff of the Army of the United States." This plea also fell upon fallow ground, and we entered the war with Spain with no adequate staff organization or doctrine. General Drum in his work on "The Evolution of the General Staff" reflected that "the situation may be better pictured by the statement of the then commissary general to the effect that his office was running perfectly until the war disrupted and disorganized it."

With the assumption of the office of Secretary of War in 1899 by Elihu Root, the foundations of our modern staff organizations

were laid. General Order 155, dated 27 November 1901, established what is now the Command and Staff College, and Section 7 of that order established the Army War College. On 14 February 1902 a bill was presented to Congress calling for the creation of a General Staff, and on 14 February 1903 the bill became law. It is noteworthy that the duties prescribed for the General Staff were very similar to those of the German General Staff as enunciated by Schellendorff in his "Duties of the General Staff."

But it is not sufficient to pass legislation creating a General Staff. The significance and functioning of a staff is dependent upon persons who understand the concept of the staff and enable it to function.

The first effective incumbent as Chief of Staff (1906-10) was Major General J. Franklin Bell, who gave close attention to the broad problems of military policy requiring remedial action. This policy was later fostered by Henry L. Stimson when he assumed office in 1911 as Secretary of War.

Although a General Staff in a modern sense was a reality, its existence and force of action were questioned in 1916 by Brigadier General E. H. Crowder, Judge Advocate General, in an opinion regarding the authority of the Chief of Staff. The opinion of General Crowder was set aside by the Secretary of War Newton D. Baker, in his statement that "the policy of the War Department, therefore, will remain as heretofore: The Chief of Staff in the name of the Secretary of War, will coordinate and supervise the various bureaus, officers and departments of the War Department; he will advise the Secretary of War; he will inform himself in as great detail as in his judgment seems necessary to qualify him adequately to advise the Secretary of War. Should any regulations or orders be necessary to place the determination herein made in proper form, the Chief of the General Staff will prepare them for my signature."

During World War I General John J. Pershing detailed officers to study the staff systems of the British and French Armies. Naturally, therefore, our staff system dur-

ing and after the war contained innovations of the British and French Staffs. During the war there was some controversy as to who was the highest authority, the chief of staff or the general in the field (General Pershing). As an aftermath of the differences of viewpoint, and the result of our experience in the war, it was to be expected that changes in the General Staff as a whole were forthcoming in the form of War Department Orders and the National Defense Act of 1920, and, later, the recommendation of the Harbord Board in establishing the sections of the General Staff.

After the war, army reorganization came to the fore. The Chief of Staff favored a more rigid control by the General Staff of the entire military establishment. The proposal became law in the National Defense Act of June 1920, which affirmed that "the duties of the War Department General Staff shall be to prepare plans for national defense and the use of the military forces for the purpose, both separately and in conjunction with the naval forces, and for the mobilization of the manhood of the nation and its material resources in an emergency, to investigate and report upon all questions affecting the efficiency of the Army of the United States, and its state of preparation for a military operation; and to render professional aid and assistance to the Secretary of War and the Chief of Staff . . .

"Hereafter, members of the General Staff shall be confined strictly to the discharge of duties of the general nature of these specified for them in this section . . . and they shall not be permitted to assume or engage in work of an administrative nature that pertains to established bureaus or offices of the War Department . . .

"Further . . . the Assistant Secretary of War, under the direction of the Secretary of War, shall be charged with supervision of the procurement of all military supplies and other business of the War Department pertaining thereto and the assurance of adequate provision for the mobilization of material and industrial organization essential to wartime needs."

Three important functions were thereby made clear: (1) the original concept of the General Staff was reasserted; (2) its planning functions emphasized; and, (3) it was barred from routine administrative functions and duties.

General Douglas MacArthur, who assumed office as Chief of Staff 21 November 1930, introduced a program of modernization and mechanization.

Current directives setting forth the organization and general duties of the General Staff are covered in Army Regulations 10-15, under which "The Chief of Staff is the Executive through whom the President of the United States, as Commander in Chief, exercises his functions in relation to strategy, tactics, and operations . . . and is the immediate adviser of the Secretary of War and is charged by him with the planning, development, and execution of the military program . . . in which . . . he exercises general supervision over the Army of the United States and the Military Establishment necessary thereto.

" . . . The Deputy Chief of Staff assists . . . by taking action on all matters generally delegated to him by the Chief of Staff and by exercising supervision over the various divisions of the War Department General Staff and the three principal Commands— and determines questions of organization and administrative procedures for the War Department and the Army.

" . . . The War Department General Staff, under the direction of the Chief of Staff, plans and coordinates the development of the Army and assists the Chief of Staff in the direction of field operations of the Army of the United States. It is especially charged with providing such broad basic plans and policies as will enable the Commanding Generals of the Army Ground Forces, Army Air Forces, Services of Supply, Defense Commands, Task Forces, and Theaters of Operation to prepare and execute detailed programs. The War Department General Staff supervises the execution of these detailed programs. In so doing, it does not engage in administrative duties or in op-

erations for the performance of which an agency exists.

The General Staff with troops in its organization and distribution of duties is modeled after the organization pattern of the War Department General Staff.

War Department General Staff Divisions are currently established as:

Personnel	-----G-1
Military Intelligence	-----G-2
Organization and Training	-----G-3
Supply	-----G-4
Operations	-----OPD

As educational media for the training of General Staff Corps personnel, the Army today looks to the several Service Schools, the Command and Staff College, the Army War College and newly created (1942) Army and Navy Staff College, and to civilian institutions.

The doctrine of completed staff work should be a doctrine of every staff, however small, and of every office of the Military Establishment, however small.

Completed staff work should be envisioned by all concerned as the study of a given problem, and the presentation of the solution thereof in such a manner as to require only approval or disapproval on the part of the commander concerned. It is the manifest duty of the staff officer to work out the details, regardless of their perplexity or irksomeness. This is not to infer that consultation with other staff personnel is not in order—it is.

The execution of completed staff work dictates that the staff officer know his job and especially that he anticipate, in advance, the requirements of the job. Further, it is the staff officers' job to advise, not ask questions. Writing a letter or promulgating a policy constitutes complete staff work *only* when the chief of staff concerned has only to give his approval or disapproval. Nor does this doctrine preclude the preparation of rough drafts; however, such a draft should be complete in the presentation of the idea.

Completed staff work results in more work for the staff officers, but more time for the chief of staff to devote to broad policy.

Japanese Infantry Tactics

(Condensed from Official Reports)

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JAPANESE infantry tactics in any fighting on the mainland of Asia can, of course, be expected to conform basically to the same pattern employed elsewhere, but the particular applications of doctrine to situ-

nese island tactics to continental conditions. In Burma, for instance, the Japanese had room for maneuver, notwithstanding the existence of the vast jungle areas; and, while conditions in Burma differ from those in



Japanese infantrymen advancing in China.

ations, for example, in China, Manchuria, and Korea, would naturally differ somewhat from methods used in the island warfare of the Pacific. Room for maneuver, as compared to the cramped spaces of the islands, is in itself so influential a factor as to justify care in the mental transplantation of Japa-

China, there is, nonetheless, a better opportunity to forecast Japanese methods on the Burma basis than on conclusions drawn from island fighting.

The Japanese infantry on the Asiatic mainland may be said to have evinced a decided preference for movement in the forms of

infiltration and encirclement. This tendency to maneuver is a historic characteristic, but of course is not to be taken as an indication of any hesitation on the part of the Japanese to utilize outright penetration under acceptable conditions. And this is true notwithstanding the fact that the Japanese infantry was not able to expect as much support from its own aircraft, artillery, and other auxiliaries as was customarily afforded our infantry in its campaigns in Africa and Europe.

Fundamental Considerations

The fundamental theme running through the entire work of the Japanese infantry was reliance upon the individual, just as reliance upon the infantry was the main theme of Japanese land tactics at large. There should be no assumption, of course, that the Japanese military mind was incapable of adjusting itself to new conditions; but it happens that the Japanese Army did not have, and has never had, the matériel to justify any other basic doctrine. The success of Japanese arms was, therefore, rightly attributable to the fighting qualities of the individual soldier, and the resulting tactical system was the outcome of individual and small-group training rather than mass-maneuver practices. The responsible Japanese militarists were well aware of this fact. Moreover, the Japanese Army lacked the transport to provide for such power of maneuver.

The tenacity of the individual and of the small group was the Japanese's strongest suit. This was so much the case that the bull-dog determination to carry out a mission, even if it resulted in annihilation, often gave an erroneous impression of Japanese strength. This factor is said to have frequently enabled small forces to overcome large ones, because Japanese units imbued with this spirit did not become ineffective until nearly all their individuals were casualties. Such capacity to drive on despite losses was characteristic of officers and men, all being so well indoctrinated that they generally continued on the mission until it was completed, regardless of cost. The fighting in

Leyte illustrated this tenacity, and the campaign on Luzon was featured by numerous suicides of Japanese wounded, who were ordered to kill themselves. The total numbers involved were reported in our newspapers as in excess of some 80,000. Discipline, lack of imagination, and fatalism are among the characteristics impelling the Japanese forward or keeping him in place, despite losses.

Any reliable professional estimate of the Japanese soldier must record, as to his morale, that he had a fanatical and fearless conception of death on the battlefield. It was primarily this feeling of personal honor in death which caused him to be aggressive in battle, and to perform almost unbelievable individual feats. However, it can by no means be said truthfully that he was super-human. In many cases, imminent death caused him to panic. He was just as subject to hunger and disease as his enemy. Physically, he was only another soldier, sometimes well-trained, sometimes not. It is training—including his lifetime indoctrination—that enabled him to perform his prodigious feats of arms. Where this training was relatively deficient, the results were easily apparent. As a human being, he exhibited pronounced traits of low development. Mentally and spiritually, he sometimes conducted himself in a very inhuman manner. Moreover, he was subject to the usual physical limitations. Although he often continued to fight, even with a club after his arms and equipment were gone, he was only an effective fighter when he was well equipped with supplies, arms, and ammunition.

Weapons

The Japanese infantry encountered in Burma, was well armed. The weapons were well suited to the tactical requirements. There was nothing particularly new or remarkable about the infantry weapons, the equipment being technically remarkable only for the number of features copied from weapons of other countries. However, the soldiers were well trained in the use of arms, so as to obtain maximum effectiveness in combat.

Thoroughness and precision were the factors most evident in such training.

The weapons of the Japanese infantryman varied with the circumstances under which he fought. Generally, he was armed with a rifle and two grenades. Cases are on record

rifle, grenade discharger, or a light machine gun and as many hand grenades as he could carry, two being usually fastened to his belt.

Elementary Tactics

Much the same may be said of Japanese tactics. Characterized by simplicity and brevity,



Japanese troops prepare to assault a pillbox.

where, fighting at close quarters, he was armed with only a bag of grenades, with the apparent intention of emptying them into Allied prepared positions if he ever reached them. Others rushed forward with only explosive charges of various types. Apart from these "death or glory boys," who grew more numerous as the battle progressed, and desperation increased, the Japanese infantryman in an attack was generally armed with a

ty the infantry tactical system suggests that battle, wherever possible, was reduced to a drill. The absence of detail was notable and in marked contrast to the extravagance found in Japanese reports. This is more significant, therefore, of a deliberate effort to simplify orders. Japanese orders seldom made references to frontages, zones of responsibility, dividing lines, and similar detail given in U.S. Army operations orders. Japanese

operation orders usually took the following forms:

a. "Lt. ----- and 15 men will, on the night of -----, capture the airfield south-west of -----, and annihilate the enemy in the vicinity."

b. "----- Battalion will occupy the high ground south of -----, and annihilate the enemy in the vicinity."

In fact, this established trend, together with the other indirect evidence of doctrine and action, justifies the conclusion that tactics were an art to the Japanese militarist. Decisions were sought by the application of skill rather than fire power or other forms of force alone. Training and the delegation to subordinates of the initiative for independent action are the factors which make Japanese tactics seem so simple.

The formulation of the plan for the execution of the order was the responsibility of the designated commander. His operation orders were almost invariably expressed in most general terms, dealing with objectives, supporting arms, location of headquarters, and the like, but scarcely ever enlarging on the method to be employed. Oral instructions regarding details of the plan were undoubtedly issued to officers, but further information on this point is lacking. However, there are indications which bear significantly on this matter. Instructions as issued by a certain Japanese Chief of Staff to unit commanders might be cited. They do not constitute an operation order; rather, they are specific instructions as to procedure, most of them being broad generalities, covered by fundamental doctrine. For example, they may direct that "a detailed reconnaissance of enemy positions be made to discover the enemy strength and dispositions," but would not say *how*. When the enemy's "fire power and fighting strength have been assessed, the strength of his individual concentrations of infantry, artillery, engineers, and armor, should be calculated. The time for attack can then be fixed." "Objectives having been selected, all possible preparations for the attack will be made." "The enemy

position will be captured by an efficient combination and concentration of all arms."

Why this recitation "out of the book" was deemed necessary is not known. It is known that the commander sometimes had models made so that small units could be instructed in the procedure of the attack. Also, he gave instructions to cover action in event of failure. This is decidedly unusual, as the Japanese rarely contemplated failure (at least, in writing), and seldom withdrawal. In fact it was obvious in one important instance in 1944, that the course to adopt, in the event of operations not going according to plan, had not been considered by higher authority, who were, in that case, at a loss as to what to do. It may be that this and similar experiences led to the adoption of special measures. The conclusion justified here is that Japanese military mentality has shown itself capable of adjustment to such conditions.

Individual Protective Measures

The Japanese were well trained in the effective use of concealment and camouflage. He used camouflage on his person and on his weapons, emplacements, installations, and vehicles of all kinds. Prior to initial attacks, in operations of considerable scale, no Japanese troop movements were seen by daylight until a few days prior to the offensive. Then air patrols reported small parties of mules, bullock carts, and motor vehicles on the roads. Very little new road and rail construction was observed, and very few men were visible from the air in the forward area. Despite this, the Japanese concentrated their whole force in the forward area immediately before the attack. Movement was made by night, and the day spent under cover.

The Japanese were expert at concealment and holding their fire. Carefully laid and cunning ruses were necessary to draw fire and gain an accurate picture of their dispositions. In a flight over the Japanese position one observer found that he could see nothing of the Japanese—not a tent, not a sampan, not a vehicle, not a human being. This ability to conceal men and material from air observation was remarkable.

Scouting and Patrolling

The Japanese were cagey operators anywhere—in the jungle, on the mountains, or on the plains, and his enemy had to be constantly on the alert to outsmart him. Carelessness meant casualties. Sometimes the Japanese would follow a patrol for long distances,

objectives such as sabotage of telephone lines and demolition of aircraft. Favorite targets were artillery pieces and motor vehicles. The objects of these attacks were predetermined with care. Effort was concentrated on items that could have an important bearing on the course of the battle, but the patrols and



A typical Japanese dugout. (Signal Corps photo.)

then set an ambush in case the patrol came out again on the same route where it went in. They employed various types of ambushes and ruses with various degrees of success. The Japanese have made great use of combat patrols to infiltrate behind Allied lines and destroy critical items of equipment and armament. These matériel raiding parties had

raiding parties scrupulously avoided willful destruction of any items which they believed they could capture and put to their own use.

Attack

In the attack, the Japanese infantryman made a detailed preliminary reconnaissance. He watched defensive movements from well-

concealed OP's. He patrolled, by day and night, to draw fire and disclose the defender's positions. He used local personnel to obtain information.

He attacked more frequently by night than by day. He usually attacked from several directions. His approach was silent and well concealed. He employed mortars and artillery for "softening up" and for covering fire, except in surprise attacks. He preferred to attack positions which were less well mutually supported from adjacent areas. He often chose the most difficult approach if he thereby got better concealment and more chance of surprise. His objective was usually the high ground.

The Allied practice of siting positions for all-around defense largely nullified the Japanese advantage of attack from the flank or rear. In several cases, when the defenders did not react to the threat of a force behind them, the Japanese were provoked into making expensive frontal assaults. Determined all-around defense seemed to leave the Japanese at a loss as to how to deal with it.

Defense

The superior defense of Japanese small units, in terms of the all-inclusive elements of skill and tenacity, is thought to have contributed more to combat effectiveness than all other tactics combined. The strength of the Japanese defense depended upon a profound knowledge and clever use of the terrain, the maximum effectiveness of available weapons, and a will to fight to the death. The important contributing factors included well-sited and concealed foxholes, slit trenches, crawl trenches, and bunkers on commanding ground, with the principal defenses on reverse slopes as well as on forward slopes. Machine guns added to the strength of the Japanese's defense by firing on fixed lines just in front of, or across his forward or rear defense lines. Defensive mortar and artillery fire was brought down on positions if penetrated. Immediate counterattack was launched against any penetration of his defenses.

In preference to employment of an out-

post line in front of his defensive positions, the Japanese appeared to prefer to prepare a position for defense and to fight within it to defend it. He preferred to post sentries day and night within the defended locality. He frequently employed a light sniper screen to disrupt an attack known to be imminent. The primary role of the snipers was to pick off the officers rather than to shoot indiscriminately at any enemy within range.

Defensive positions were usually sited on commanding ground. The main position was typically on the reverse slopes, with covering OP's and patrols on the summit and on forward slopes initially. Given time, the Japanese constructed a very powerful defensive position.

In villages he immediately dug himself in, making use not only of buildings, but of trees, or thick clumps of vegetation of any kind. This practice proved an effective obstacle to attacking tanks. The Japanese skill in cave and cliff defense has been well illustrated on many occasions.

Machine guns, battalion guns, and light regimental artillery were used well forward and with great skill. Artillery frequently employed fire by direct laying. Mortars were employed well forward. Grenade discharges were well utilized, but did not always cause a great number of casualties. The standard practice was to withhold all fire until a good target presented itself and then bring down intense fire, though tension caused an increasing tendency to reply to our "jitter parties" or small reconnaissance patrols.

Combat Engineers

Japanese combat engineers were typically employed in such close conjunction with the infantry that tactical engineer matters became, in effect, a department of their infantry tactics. Customary engineer use was highly decentralized by attachment to small combat teams, infantry battalions, companies, and even lower units. The primary mission of such engineers was to facilitate the movement of their own troops and impede the enemy's. They constructed bridges and similar works, executed demolitions, laid mines and put in antitank obstacles, removed mines

and obstacles or provided passages through them or over them, constructed defensive posts, acted as infantry where necessary, and provided other engineer services such as map and water supply. In the main, they used hand tools and equipment, and employed local labor.

A typical engineer mission in attack was

Engineers provided the means for initial river crossings, using some standard equipment, but relied in the main on expedients. They were outstanding in improvisation and the use of bamboo, standing timber, and other locally occurring materials, particularly for rafts and bridges.

Road work was done wherever possible by



Japanese self-propelled 75-mm gun. (Signal Corps photo.)

the use of bangalore torpedoes. In defense, the primary work was with the more elaborate obstacles. The infantry placed most booby traps and anti-personnel obstacles near its own positions, and in some cases laid anti-tank mines and constructed lesser road-blocks. In defense, engineers were frequently employed as infantry.

the use of coolies to the maximum extent, under engineer supervision.

Tanks

Japanese tank employment against the Western Allies in Asia mainly occurred in the Burma area, where jungle conditions imposed restrictions to be borne in mind in

this connection. In one operation of considerable importance, a single tank regiment appeared. It had four tank companies and one of armored cars. It would appear that there were three medium companies and one light, each of sixteen tanks, each company having four platoons of three tanks each, and four tanks in Company Headquarters. Types included the tankette with and without the 37-mm gun, a light type, and a medium tank with a 47-mm gun. The armor was very light. Limitations of ground and weather also restricted the use of tanks.

Tank employment for reconnaissance occurred in a few instances. On various occasions, however, tanks approached by night. Sometimes tanks were used in support of infantry attacks on defended perimeters. In the majority of cases, the attack was launched at night; once it came in at dusk under cover of a smoke screen. The maximum numbers of tanks so employed in such an attack was ten. Tanks were used to attack road-blocks at night. Japanese tanks held their fire until almost at point-blank range. Offensive tank employment was in small numbers, almost always along roads, usually with infantry, and never for exploitation.

Defensively, Japanese tanks were used to stiffen positions in villages. In some instances, tanks were dug in. Tanks added their fire power to a light infantry screen in withdrawal, and were often sacrificed in order to break contact. It is clear that such tanks were not intended to act as a mobile reserve for counterattack, and that their role was primarily static. In effect, they formed strong-points in the defensive layout. They were seldom used for counterattack within a defended perimeter. They were used sparingly as escort for motor-transport convoys.

Japanese tanks lacked equipment to facilitate passing obstacles. Experience does not suggest that they had a particularly good mud performance, and they appeared to get "bellied" easily. Otherwise their cross-country performance appeared to be good. The Japanese seemed to possess no special recovery vehicle. Each tank platoon appeared to have a radio, but communication within the platoon

was by flag. All maintenance appeared to be done by tanks crews, except that the presence of a welding truck was occasionally reported.

Primary targets for tanks were infantry bunkers and wire; secondary targets were tanks and antitank guns. Ranges were usually 100 yards, or less. All tanks carried a higher percentage of HE than of AP. Tanks also had a standard smoke producer and smoke candles, but there were no known instances of production of smoke by tanks themselves.

In the Burma operations of 1944, the Japanese tanks were of about March 1942 manufacture. At that time, Japanese views on tank design and tank warfare were founded largely on experiences in China. The Chinese terrain had been relatively open, and the Chinese troops deficient in antitank guns, so that speed, rather than protection or armor, was the most important consideration. No Japanese tank captured in Burma in 1944 had armor in excess of 25-mm.

Employment of tanks was, in general, hesitant and ineffectual, incurring losses out of all proportion to results. These facts were realized by the Japanese, for he appreciated that his tanks were insufficiently armored. He consistently shrank from employing the maximum number of tanks which the ground permitted, and from giving close support to infantry in daylight when there was any danger of antitank guns or Allied tanks being encountered.

Antitank Defense

Allied tanks surprised the Japanese, on occasion, by their mere presence, but more especially by their hill-climbing ability, and their effectiveness in various roles; blasting enemy bunkers, giving close support to infantry over terrain previously considered more or less unsuitable for tanks, operating as armored columns in clearing roads, performing a variety of tasks such as rear-guard actions in withdrawals, defense in box perimeters, and by inflicting heavy casualties on the Japanese and lessening our own infantry casualties.

The Japanese reacted in various ways. For instance, they brought into action a 37-mm antitank gun, but it was so ineffective that it was virtually given up except to snipe at tank commander's heads. Subsequently, they used the 47-mm antitank gun, a very effective weapon against the medium tank. They also made use of HE and AP shell from their standard 75-mm gun. As the campaign progressed they made increasing use of antitank land mines. Their magnetic mine was partially countered by placing wire netting at a distance over the horizontal surfaces of tanks. They also prepared antitank ditches, and made use of natural obstacles, linking them by ditches.

Allied tank casualties were incurred, during the later stages, from the Japanese infantry guns (70-mm and 75-mm), artillery, mortars, 47-mm antitank gun (mounted in medium tanks), hollow-charge rifle grenades, magnetic mines, molotov cocktails, and land mines with sympathetic charges.

Antitank-gun employment was good. Positions were well forward and well camouflaged. They were generally sited to fire from the flanks on the approaches. Cleared fields of fire were small to contribute to concealment and surprise. Fire discipline was good. Fire was opened at ranges as short as fifty yards; in one case, at ten yards. Guns covered road-blocks, mine fields, other tank obstacles and defensive positions. There was not much indication of siting for mutual support, but this was to be expected.

Gunnery was accurate, though the aim was usually low, at sides, rear, and tracks. Aggressive effort was made to destroy crippled tanks by close combat. Flanking and encircling attacks seemed to be encouraged. Guns were sometimes installed in positions which appeared almost inaccessible. Thorough preparations were characteristic of Japanese antitank tactics.

Japanese infantry guns did not, for the most part, inflict serious damage on Allied tanks in spite of frequent hits and occasional penetrations. The muzzle velocity was too low. Gunners proved susceptible to Allied

infantry attacks, and several guns were captured intact. The Japanese were nervous about Allied counterbattery, and tended to fire from sight defilade for about fifteen minutes, then withdraw the gun, and go into another position. Their light and medium artillery was brought down on Allied tanks wherever possible, and was generally effective.

The hollow-charge rifle grenade and special rifle discharger cup were issued on a restricted basis (not more than six per infantry regiment) and caused some damage at ranges as short as fifteen yards, but penetration was limited, splash nonexistent or not extensive, and interior fires very rare.

Mortars scored direct hits on Allied tanks, and near misses did damage to bogies. Small-arms fire effect generally was limited to personnel casualties when tanks were proceeding with open hatches.

Considerable data as to use of magnetic mines and land mines have become available, but discussion of details would involve a separate study. General improvement occurred in Japanese antitank defenses during warfare on the Continent, the main damages being from his land mines.

Miscellaneous Obstacles

Compared, for example, with German practice, use of booby traps was on a small scale, but there was an increasing trend along this line. Technique was faulty, and equipment inadequate. All booby traps were improvisations.

As to other personnel obstacles, barbed wire was limited, but bamboo was extensively employed in Burma in a variety of ways. Sharpened bamboo sections, stuck into the ground to protrude two feet at a forward angle of 45 degrees, were more effective than Japanese barbed wire. Bamboo poles were also used along approaches, being installed horizontally at various heights to give warning of hostile approach. Strong brushwood fences were also installed in forested areas by using cut trees, branches, and bushes piled in an irregular fashion to form a barrier three by three feet in cross section. Troops exposed by crawling through or jumping over these obstacles were subject to fire, and were further

hampered by barbed wire erected some three to five yards inside of the barrier. Such utilization of local means was characteristic.

Chemical Warfare

The Japanese were found to have a fairly complete line of chemical warfare weapons, but reports indicated the absence of extensive training for gas warfare. No chemical units appeared in any strength, but units as small as a company were equipped with hydrocyanic acid, toxic smoke, screening smoke, and tear-gas candles and grenades. Mustard bombs, mustard and lewisite-filled 75-mm artillery shells, and 150-mm hydrocyanic acid-filled shells had been used against the Chinese in the battle for Ichang in 1941. Incendiary bombs were frequently used during bombing of airfields and supply points.

Japanese troops on the Continent were equipped and trained for gas defense, but no collective equipment was noted. Many units stored their masks in dumps, and there appeared to be a general belief that neither side would use gas in this theater. It seemed that the Japanese did not intend to start the use of gas; their air inferiority would have put them at a decided disadvantage.

Medical Service

The Japanese Army in Burma suffered disproportionately heavy casualties from the lower standard and efficiency of medical care. The incidence of disease, particularly malaria, was undoubtedly much higher than among the opposing Allied forces. Dietary deficiencies, because of insufficient quantity of food, also contributed materially to the lower physical efficiency and the higher and more destructive disease and fatality rate.

There was a larger proportion of deaths among Japanese battle and disease casualties than among the Allied forces. The absolute death rate was increased also by the Japanese practice of killing the seriously ill and wounded on occasions when the combat forces retired and could not evacuate them. In consequence, physical incapacity and death were sapping the strength of the Japanese Army at a rapid rate.

Higher Command and Staff

In Burma, site of the principal continental campaigns of the Japanese against Allied troops, the Japanese general staff work varied remarkably. With the exception of combat reconnaissance and road information, military intelligence work was ineffective. The tactical planning and initial phases of attack were adroitly executed with secrecy and surprise. The logistics plan in the Imphal offensive was adequate initially, but collapsed eventually because Allied supplies were not captured and the Japanese overland supply system went to pieces in the monsoon.

The principal, though intangible, element that influenced their planning and operations on the continent was the "face saving" philosophy of the Japanese. This philosophy is thought to have caused them to falsify intelligence and operational information so as to make their gains look large and their enemy's small. This policy had little bad effect during the first stages of the war in Southeast Asia when opposition was insignificant. Later however, when the Allied strength surpassed theirs, this policy of self-deception hoodwinked no one but themselves.

* * *

Island campaigns, even in the Philippines, naturally involved elements less trustworthy as a basis for tactical calculation of continental operations than can be found in operations on the Continent itself. Here, data are admittedly also subject to correction, because Allied experience with troops, other than Chinese, had been limited, and the Burma exception is exceptional also since local conditions were much different from those to be expected in China and Manchuria.

However, it may be said justly that not only in Burma, but everywhere, the Japanese Army was the Japanese infantry. The Japanese Air Force in this theater offered little basis for any conclusion as to its possible effectiveness nearer the homeland. The principal Allied problem was supply, and this was a continuing factor anywhere in Asia. It is not unreasonable to assume that, in the last analysis, the rate of advance of

Allied operations depended primarily upon the rate at which men and supplies could be moved from X to Y, and small Japanese units at critical points annihilated.

Artillery opposition was not on the European scale. Engineer resources were limited. Air supply was not effective. In the field of antitank warfare, both obstacle and gun could be expected to show significant development. The main danger, however, was the land mine. Wastage by disease and battle casualties remained relatively great. Generalship and staff work was reasonably good.

It is certain, however, that the fundamental strength of the Japanese was in the defensive power of their small units.

The growing offensive power of the Allies overtook and continued to outstrip the Japanese. The inherent weaknesses of the Japanese Army accelerated its complete defeat. Its fundamental weaknesses were lack of fire power, sustained striking force, and lack of effective air support, together with the psychological tendency to overestimate its own capabilities and to underestimate the enemy's.

We are an island—a continental island to be sure but still an island—and we have developed and perfected a kind of military power which is unique. It is a combination of sea, air and ground forces which can operate at great distances, across the ocean. No one can afford to forget the existence of this extraordinary instrument, or to leave it out of account in calculating the balance of forces anywhere. For there is no other military instrument which has a comparable range and reach, none so flexible, so mobile, so quickly concentrated, or so capable of exerting irresistible force at the point of impact. It would be absurd for anyone to imagine that with this instrument in our hands we cannot speak with equal diplomatic authority in any of the contested regions of Europe, Asia and Africa.

Walter Lippman in "New York Herald Tribune"

The Army that won the war needs no definition, apology or justification by me or anyone else. Its record speaks for it. It was the finest military organization the world has ever seen. It was perfectly adapted in quantity and quality to the tasks assigned it. In the accomplishment of these tasks it covered itself with everlasting glory.

General of the Army Dwight D. Eisenhower

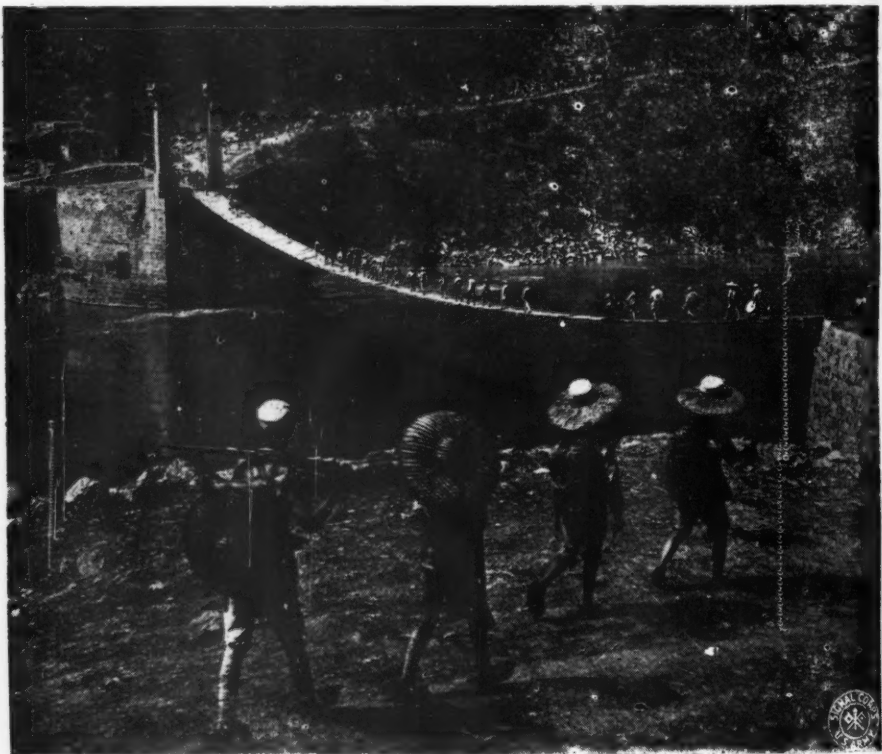
Hand Carry

COLONEL A. S. NEWMAN, *General Staff Corps*

IN the last eighteen months of the war in the Pacific I was in three campaigns—and in all three of these campaigns supply by hand carry became a limiting fac-

tor in certain stages of the operations. In the Tanehmerah landing at Hollandia the leading regiment was supplied almost entirely by hand carry for the first five days, until the first air drop could be made. The usual problem, however, is to supply a re-

inforced battalion (or smaller force) which must operate on hand-carried supplies—ordinarily for a limited time until a better means of supply can be placed into effect.



Supplies in the China-Burma-India Theater carried by hand across the Salween River. (Signal Corps photo.)

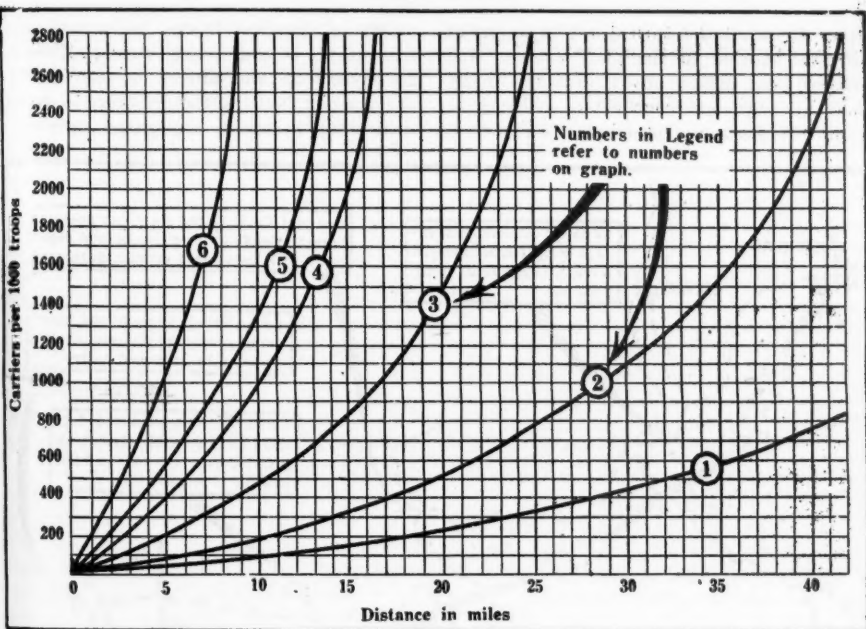
tor in certain stages of the operations. In the Tanehmerah landing at Hollandia the leading regiment was supplied almost entirely by hand carry for the first five days, until the first air drop could be made. The usual problem, however, is to supply a re-

Realizing the dangers of generalizing on

limited experience, as well as the tendency toward predicting future needs for others based upon my own instruction by Professor Experience, I still believe that some knowledge on this subject of hand carry will sooner or later come in handy for nearly all infantry officers in combat.

Carriers per 1000 troops

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LEGEND:

1. 50% K—50% D ration only. Carrying party all carrying 1 mile per hr, 10 hr work day, each carrier carries one case (45 lb).
2. 100% K ration. Other conditions same.
3. 10-in-1 ration. Officers and NCOs of carrying parties not carrying, but acting as armed guards.
4. Same conditions, except 1 in 3 men is a guard (not carrying) and 15% trail overhead (service personnel) based on Front Line Troops are added.
5. Same conditions as "4," except .1 u/f expended at front daily also carried. (Basis: Weapons of Inf Bn) and D/S medical supplies carried per day for all personnel.
6. Same conditions as "5," except .5 u/f expended daily at front, .1 u/f by trail guards. The trail service personnel is increased to 25%.

Figure 1.

Of course there are such an infinite number of varying situations that even a Culbertson could not devise a practical set of hand rules. So the need is for a general understanding of the problems incident to supply by hand carry; for the delineation of general principles; and for a method of approach toward solving such problems.

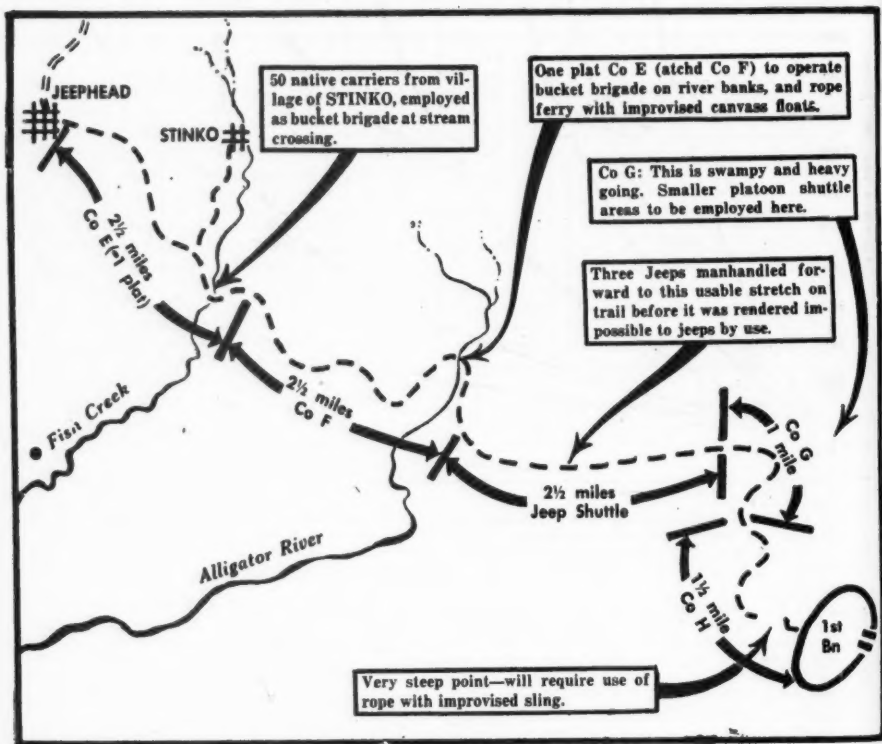
The Division Commander anticipated the possible development at Tanemerah in which hand carry would be a complete limiting factor in the speed and depth to which we could push our attack, and so directed that a staff study be made—using the best

terrain data available (which was extremely limited). The plan turned out to be practicable and was employed—with on-the-spot variations, without which no hand carry plan can function at maximum efficiency.

As usual, Professor Experience was along to kibitz and offer helpful suggestions where men sweated along that tortured, tortuous, hand-carry route. So in addition to our original plan we came up with some new ideas, and such an interest in the matter that several of us on the staff held a post mortem on how we played out the hand-carry deal as dealt to us in that campaign.

Our Assistant G-4 turned out to be one of the most morbid in the post mortem, and dissected and delved about until he finally came up with his conclusions reduced to graphic form—reproduced here as Figure 1.

One of the first things to be noticed on this graph is that every curve approaches an asymptote, and thus it is seen that for every set of limiting factors there is a practical limit to which any given number of



Above sketch plan was prepared by C.O., 2d Bn, who was assigned (by Regt order) the job of getting supplies from JEEPHEAD to 1st Bn. Attached to the plan were the following notes:

1. Bn S-4 will get three Jeeps forward at once to point indicated. He will arrange for loading and unloading details. Co G to furnish an officer to be in direct supervision of Jeep shuttle.
2. Bn S-4 in overall charge as personal representative of Bn Cmdr, 2d Bn.
3. Troops will bivouac in their trail sectors.
4. Bn S-4 arrange for natives from STINKO village for bucket brigade at stream crossing—"attach" them to Co E.
5. Bn Sig O establish communications—radio and wire—at earliest possible moment.
6. Location of Co CPs to be reported without delay.

Figure 2.

It is worth careful study, and can be used as a general guide. Figure 1 shows not only solutions for the given situations, but also illustrates a method of approach which may be used in solving other similar problems.

troops can be supplied by hand no matter how many carriers are available.

It is also at once clear that the number of carriers which are available or which can profitably be employed establishes a practi-

cable limit to the distance the fighting force can operate from its base.

In order better to discuss the hand carry problem concretely, let's take a specific case—say the supply of the 1st Battalion by hand, using the 2d Battalion as carriers (see Figure 2).

A part of any hand carry plan for an appreciable distance should be a shuttle system. The best way to set this up is to assign sectors of the trail to a certain number of carriers under a sector commander—the length of each sector and the number of carriers depending upon the difficulty of carry as determined by the nature of the terrain and possible enemy interference. Direct liaison between adjacent sectors is desirable, and sector commanders should have authority to make mutual adjustments in their sector boundaries—reporting the changes.

In addition to the sector commanders, there must be an overall trail commander who moves up and down the entire route, looking for bottlenecks and making day-to-day readjustments. In this way only can the system be constantly changed to meet the changing conditions on the trail caused by weather, pioneer work, and threatened or actual enemy action.

While the shuttle system and the bucket brigade principle are necessary for hand supply of any large force (battalion or more) at any real distance, there are many cases where daily round-trip carrying parties are practicable. However, to stretch this simplest of all methods beyond its practicable limit will quickly result in failure. Of course in each situation special problems arise, and there is no substitute for good judgment in the "tactical" disposition of the carriers available.

Using the graph shown in Figure 1, the total distance is determined over which the

available carriers can supply the operational force. Having determined this approximate distance (care should be used not to become involved in decimal points and efforts at too great a degree of exactness, because there are many factors whose effects can only be estimated—muddy stretches, steep hills, stream crossings, the weather, etc.) a reconnaissance of the route should be made, in person if possible; otherwise a map reconnaissance, including examination of aerial photos if available.

Using scratch paper for figuring, the hand carry plan is prepared in sketch form (see Figure 2). Fragmentary orders (oral or written) can quickly place the plan into effect. A clerk can reproduce the sketch plan for distribution to all concerned.

Notice that distances on the sketch are seven and one-half miles of hand carry, plus two and one-half miles of jeep shuttle. By looking at Figure 1 it will be seen that seven and one-half miles is the distance 1,000 men can be supplied with 800 carriers under conditions for curve Number 5. The 800 is estimated effective "carrier strength" available in the 2d Battalion. Certain security detachments must be allowed for in most cases, in addition to that required on the trail itself. The 1,000 is the estimated strength of the 1st Battalion, based upon added attachments which normally accompany a reinforced battalion.

It should be emphasized:

- (1) Have a simple workable plan; do not get too technical or unduly complicated.
- (2) Anticipate the need for hand carry, and prepare a plan ahead of time wherever possible. It can be modified.
- (3) See that every one concerned knows about the plan.
- (4) Designate one man to be directly in charge of getting the job done.

The Solving of Map Problems

LIEUTENANT COLONEL P. PERSONS, *Coast Artillery Corps*
Instructor, Command and Staff College

This article is printed in the belief that it will be of value to officers who are already assigned, or who expect to be assigned, to the Command and Staff College, or any other Service School, as students, as well as those taking assigned courses. The subject matter is basic for any student, but it is often overlooked or forgotten by many who thus hinder their otherwise good chances to complete the course successfully. It is a refresher for some, and good advice for all.—THE EDITOR.

SOONER or later in his career, every officer is certain to be required to solve map problems—whether he be a student at a service school, taking an extension course to fit himself for a higher grade, or actually confronted with a tactical problem in the field. An officer's first experience with a map problem (a problem in which one or more military situations are stated and solved in writing with a map as the only guide to the terrain) is likely to be discouraging, particularly if he is in a school and must work against time. He feels himself on unfamiliar ground and longs for a simple technique for approaching these problems. This article deals with such a technique and presents the principles which will insure application by the student of a thorough, logical and simple line of reasoning to the solution of tactical problems.

Approach to the Problem

The first step in arriving at the solution to any problem is to READ THE PROBLEM. Now, this is such an obvious statement it seems rather puerile to even mention it, but in practice the most common cause of failure on the part of the student to arrive at a workable solution is his failure to read the problem, and understand it. Times without number students ask questions of an instructor the answer to which is contained in the statement of the problem. The student did not read the problem carefully, or did read

into the problem some obscure meaning. All map problems are thoroughly checked and rechecked to make certain they are clearly and simply stated. Nothing is to be inferred or "read into" the problem. Furthermore, careful reading is necessary in order to put the student into the "picture." Situations in the field are continuing actions and are never new in every detail; but map problems, designed as they are to bring out certain lessons may shift quickly in locale and change in situation. As a result, much time must be spent in digesting the situation, and in understanding what is required before attempting a solution. Yet, students constantly solve, in whole or in part, some problem other than the one at hand; or, when an extremely simple action is called for, go into great detail, apparently on the theory that long and complicated solutions are essential to show respect to the author and the school. Frequently failure to read the problem carefully leads to planning too far in the future. Given the problem of preparing plans for a river crossing, students include plans for action to be taken after the crossing is complete—a different problem entirely. Curb the instinct to begin work immediately. First read and understand the problem.

The next step in solving a problem is: DO NOT FIGHT THE PROBLEM. After reading the problem and carefully studying it, the student may find that he disagrees with it in whole or in part. He will have a tendency to fight the problem. No problem is perfect; a particular problem may seem utterly stupid to the student. He may think that much needed information has been omitted; he may not be able to conceive how any commander could ever get himself into such a position; he may disagree with the entire concept or just with the manner in which the troops are organized for combat. But it is a mistake to waste time in criticizing the problem; it only induces a state of mind which prevents good work. Take the problem

as it is and make the most of it. One should no more fight a map problem than he would fight a similar problem in the field. Each problem usually requires enough legitimate work to utilize fully the available time; to waste this time in fruitless mental cursing accomplishes nothing; and, where the student is working on a time limit, frequently results in a mental panic conducive to confusion, carelessness, or a nervousness which ends in a last minute rush to get something down on paper. There is no pay in combat, or in any service school, for the solution to any problem except the one at hand. Do not fight the problem.

The third step is: **ANALYZE THE PROBLEM.** Analyze it in terms of the requirement. Determine first whether a decision, a plan, or an order is called for. Then reread the problem, if necessary, to fix firmly in mind the *mission*. Since the mission is always the actuating factor, it is essential that what the unit concerned is directed to do be clearly understood at the outset. In addition, what role is the solver to play? Is he the unit commander or a particular staff officer? The solver must play the part of that individual, must view the problem from his position, and attempt to live the problem while working as if under combat conditions.

If the problem requires first a *decision*, examine the task to be accomplished. What are the difficulties to overcome? What means are available to overcome these difficulties? Of the means available, which can best be utilized to accomplish the mission? Once the circumstances affecting a given situation have been examined carefully in light of the mission, a decision can be arrived at. Having answered the *what—when—where—* and *why*, and compared the advantages and disadvantages of each possible line of action, the resulting conclusion is the decision. The correctness of this decision will be judged solely by the completeness with which it meets the mission, as affected by the situation, at the time it is put into execution.

The *plan* is the detailed, comprehensive scheme for putting the decision into effect. Planning is a staff function; making the de-

cision, usually embodied in a directive, is the job of the commander. The plan should have the characteristics of simplicity and flexibility. The simpler and less complicated the plan, the surer it is to succeed. A plan founded on conditions that contain a lot of "ifs," "whens," and "provided thats" courts disaster. Plans must be kept simple and straightforward.

The decision, augmented by the plan, is put into effect by *orders* issued to the units concerned. These orders may be oral or written; they may be fragmentary or contained in a complete five paragraph field order, or in an administrative order. However issued, they must be clear, concise, and sufficiently complete to avoid misunderstanding and to insure cooperation and coordination of all elements in carrying out the plan.

So, looking at the problem, does it call for a decision, a plan, or an order?

Aids to Solution

To solve any problem, some knowledge, either practical or theoretical, of the subject is required. Practical knowledge consists of those facts learned personally, by practice or experience, in garrison, on maneuvers or on the battlefield. We learn through our experience that certain methods will work under given conditions, and that certain methods will not work. Obviously, the greater and more varied an individual's own personal experiences have been, the quicker he can arrive at a satisfactory solution to the average problem. His reactions to certain situations have been conditioned and become almost automatic. An individual of this type must exercise caution, however, to be certain his methods do not become outmoded. Those individuals without a great deal of personal experience must rely on their theoretical knowledge, knowledge gained from a study of the experiences of others and a study of accepted doctrines in field manuals, and especially on their familiarity with the sources from which needed information can be obtained.

Imagination plays an important part in solving map problems—not imagination of

the "star-gazing" or crystal-ball" variety, but rather the ability to visualize the situation as it exists, and as it would exist if certain lines of action were adopted. Imagination must always be tempered by logical thinking and knowledge. The poorest and least productive way to use imagination is to try to imagine what solution the author had in mind when he wrote the problem, or what solution is expected. Give the solution the situation appears to require and the one dictated by common sense.

To assist in visualizing the problem, it is frequently advisable to make a rough diagram. Often a sketch or hastily-made overlay will clarify the situation and quickly give an overall grasp of the problem. The situation may be further clarified by underlining all pertinent facts—for example, the friendly troops may be underlined in blue, the hostile forces in red, and vital time elements in black. Underlining simply emphasizes the essential information and makes it stand out from the purely background material.

A check-list of all units involved, including both organic and attached troops, will be found helpful. Such a list should be made as the problem is being read, and each unit checked off as it is accounted for in the solution. This system assists in avoiding omissions and reduces the chances for errors in improper identification of units.

Backward planning is useful as an aid in the solution of many problems. Backward planning, as the term implies, means beginning with the desired result (where we want to go) and working back step by step to the starting point (where we are now). Many complex problems are simplified by using this method; and, further, this method offers a continuous check on the solution.

At a service school where a definite amount of time is allotted for the solution of each problem it is advisable to budget this time, to set up at the beginning a time schedule for each phase of the work, and to adhere to it. As an illustration, let us assume sixty minutes have been allotted for a particular problem. One way this time might be used to most advantage is as follows:

Reading, underlining, check-list.....	10 minutes
Rough solution.....	25 minutes
Writing final solution.....	15 minutes
Rereading and checking.....	10 minutes

This is merely an illustration. Each individual must work out a time schedule which best suits his own needs. But in every case some time must be allotted for rechecking the solution before it is turned in—to eliminate any omissions, correct any glaring errors, and to insure that all work is turned in. This last is most important, since excellent solutions can be nullified by failure to turn in one or more pages of the script.

Nearly all problems require the computation of time and space data incidental to their solution. This data should be computed early in the problem, carefully checked, and used as the working basis for the solution. Here concrete facts are dealt with. By completing these mechanics early, the remaining time can be devoted more profitably to arriving at sound conclusions based on the calculations already made.

Conclusions

The solution of map problems can be relatively easy if the student has an adequate background of knowledge bolstered by a conscientious study of pertinent texts, uses his imagination and common sense, will read the problem carefully and accept it as it is written, and will observe this technique as a guide:

1. Set up a time schedule and adhere to it.
2. Have necessary working materials (pencils, map measurer, straight edge) readily accessible.
3. Make simplicity the keynote of the solution.
4. Make a rough solution first.
5. With the mission in mind, will this solution work?
6. Put the solution into final written form.
7. Check the final solution:
 - a. Is it legible?
 - b. Are all units accounted for?
 - c. Can units accomplish tasks assigned?
 - d. Do subordinate missions fit overall plan?
 - e. Does the solution answer all requirements?

Military Currencies in the Present War

LIEUTENANT COLONEL H. S. PATTON, *Finance Department*

MILITARY Currencies may be broadly defined as currencies of distinctive design or special issue which are prepared and used by belligerent governments, in invasion operations and in occupation of external territories under military government, and which are put into circulation and made legal tender under a military authority.

Types of Military Currencies

Two major types of military currencies are to be distinguished: (a) those bearing the name of the belligerent government and denominated in its own monetary unit; and (b) those specially prepared by belligerent governments for issue in invaded or occupied territories, and denominated in the customary monetary unit of the territory concerned.

Examples of the first type which have been used in the present war include German military marks (*Reichskreditkassenscheine*), Japanese military yen, British Military Authority notes, and United States yellow seal and Hawaiian Series (brown seal) dollar notes.

Examples of the second type which have been used to date include currency notes issued by the Japanese Government in the customary monetary units of occupied countries or colonial areas of Southeastern Asia and the Pacific, and by the Allies in the form of Allied Military currency denominated in lire and marks.

The first type of military currency has frequently been called "spearhead" currency, since it has generally been used in initial invasion operations, until military occupancy has been established. Invasion planning in modern warfare necessarily includes the prior provision of an adequate supply of currency for troop pay and local procurement purposes. While it is simplest, most convenient, and most conducive to secrecy for the invader to use his own regular currency, there are obvious disadvantages to this method. It means spending the invader's own money in enemy territory where

it automatically passes into the hands of the local population by whom it may be hoarded or surreptitiously transferred to neutral countries. In any case the increased circulation is largely represented by foreign holdings of the issuing country's undifferentiated legal tender currency which must be eventually honored. Moreover, in the event that such currency is captured by the enemy during hostilities, it may be transferred by devious channels to enemy agents in the issuing country, and used to finance espionage and sabotage activities.

For these reasons "spearhead" currencies, while denominated in the monetary unit of the invader's country, have been prepared as special military issues or with some distinctive mark to differentiate them from the regular full legal tender currency of the belligerent government.

Military Currencies used by Axis Powers

The first form of military currency used in the present war was the military mark (*Reichskreditkassenschein*) introduced by the Germans in their invasion of Poland in 1939, and extended to the Western European countries overrun in 1940. These notes were issued by the *Reichskreditkassen* which was established in the first month of the war as a subsidiary of the *Reichsbank*, and which set up mobile branches in occupied areas which functioned as emergency military banks and currency exchange offices. This institution furnished German Army paymasters with special mark notes which were proclaimed legal tender in occupied areas at fixed rates of exchange in terms of local currencies, but which were not convertible into regular *Reichsmarks* nor acceptable outside the area of issue.

In most occupied countries (apart from Western Russia), the issuance of *Reichskreditkassenscheine* was of relatively short duration, since the Germans early obtained adequate supplies of local currencies through the imposition of occupation costs on de-

feated countries or through borrowings from central banks of satellite countries. In France, for example, after the armistice of June 1940, occupation costs were levied at the rate of 400 million francs per day. These were met by the Vichy government almost entirely from borrowings from the Bank of France which credited the scheduled sums to the deposit accounts of the *Reichskredit-kasse* though which they were made available to the German occupation authorities. The Bank of France moreover was required to redeem in francs, at the proclaimed rate of 20 francs to the mark, all local holdings of military marks previously put into circulation in France by the German invaders, such redemptions being credited on occupation costs account. By such methods, which were applied generally in occupied territories, the Germans thus not only effected the retirement of the bulk of the military marks initially introduced, but also compelled the subject countries to issue their own currencies in ever inflated volume, to pay both for the maintenance of the occupying forces and for domestic labor and goods furnished to the Germans.

Although the Japanese made use of military yen notes in certain invaded areas of China, these were generally not employed in the countries of Southeastern Asia and in Pacific islands which were overrun in the months following Pearl Harbor. Here the Japanese met the currency needs of their invading or occupying forces by printing notes bearing the inscription "The Japanese Government," and issued in the customary monetary unit of the political division concerned, such as pesos in the Philippines, rupees in Burma, dollars in British Malaya, florins in the Netherlands East Indies, and shillings in Australian mandated islands. Mobile printing presses for turning out notes frequently accompanied the Japanese forces. By proclamation these military notes were given legal tender parity with the regular local currency. In pursuance of its vaunted "Greater East Asia Co-prosperity" policy, nominal independence had been accorded to puppet governments in Manchukuo, North

China, Central China, the Philippines and Burma, and in each of these regions Japanese sponsored central banks were established to issue local denominated currency notes which the Japanese attempted to maintain in parity both with their military notes and with regular Japanese yen.

Military Currencies used by the Allies

In passing from the defensive to the offensive phase the American and British planning authorities were confronted with the twin problems of determining: (a) the character and form of military currencies to be used by their forces in joint invasion and occupation operations and (b) the treatment to be accorded currencies circulating in liberated or enemy countries, involving the rates of exchange to be proclaimed for local currencies recognized as legal tender.

French North Africa:—In the Allied invasion of French North Africa towards the end of 1942 it was agreed that, as spearhead currency, the British forces would use British Military Authority notes and the American forces United States "yellow seal" dollars. British Military Authority (BMA) notes, which had been previously used in certain conquered areas of Italian Africa, were essentially of the same type as German military marks, not being legal tender within Great Britain. The "yellow seal" dollars used by the American forces had no special imprint but were regular United States silver certificates, differentiated merely by a yellow instead of the ordinary blue seal. These respective spearhead currencies which were interchangeable within the theater at the rate of one BMA pound to four yellow seal dollars ceased to be used for the pay of Allied troops as soon as arrangements were made with the recognized French North African government whereby franc currency notes issued by the Bank of Algeria and the State Bank of Morocco were made available to United States Army Finance Officers and British paymasters against dollar and sterling credits at rates of initially 300 francs to the pound and 75 to the dollar, and after

the Casablanca Conference of 200 francs to the pound and 50 to the dollar. Thus Allied troops, civilian employees and local suppliers were paid in the local legal tender currency in which prices, wages and contracts were expressed. Thus dollars and pounds, instead of circulating in the area, accrued to the credit of the French North African banks at New York and London, and were made available for payment of civilian supplies shipped to French Africa.

Italy:—In the financial planning for the invasion of Sicily an unprecedented type of military currency was evolved in the form of Allied Military lira notes which were produced in the United States for joint use of American and British forces and the Allied Military Government in Italy. Although United States yellow seal dollars and BMA notes were employed in the initial invasion stage in Sicily these were soon replaced by Allied Military lira currency, paid to troops at the rate of 100 lire to the dollar of 400 lire to the pound.

This currency was issued through a specially created Allied Financial Agency, operating under directives to the Allied Commander in Chief from the Combined Chiefs of Staff. Establishment of military government involves responsibility on the part of the occupying authority for the maintenance of the civilian economy, "which necessarily includes the provision of an adequate and acceptable legal medium of exchange. So far as civilian requirements were concerned the Allied Military lira currency was designed, not to displace, but to supplement the regular local currency. Proclamations issued by the Allied Commander in Chief declared that Allied Military lira currency and regular Italian lira currency were to be equally legal tender and to be freely interchangeable on a one for one basis. Since bank stocks of local currency were removed in certain places by the retreating enemy and since the plates for the printing of Bank of Italy notes remained in enemy hands, it was necessary for the Allied Financial Agency at times to make advances of Allied Military cur-

rency to Italian banks for reserve purposes as well as to government bodies for fiscal purposes.

To the extent that Allied Military lira have been transferred to Army disbursing officers by the Allied Financial Agency equivalent dollars have been charged to the relevant War Department appropriations and held in an earmarked account by the U.S. Treasury. In recognition of Italy's contributions to the Allied war effort as a co-belligerent and of its economic needs, it was announced in October 1944 that dollars equivalent to the net pay of U.S. troops expended in the local currency, through civilian channels, in Italy, could be made available to the Italian government in addition to the proceeds of the Italian exports, for the purpose of additional supplies of civilian or reconstruction goods in the United States. This is in conspicuous contrast to the German system of imposing huge occupation costs on conquered countries, and requiring the latter to pay for their own exploitation.

Liberated Western European Countries:

—In contrast to the invasion of Italy as an enemy country, the Cross-Channel operations initiated in June 1944 involved the expulsion of the enemy from the home territories of United Nations relations with whose governments-in-exile or national committees, had been maintained or developed by the British and United States governments during the war. In planning for provision of the currency requirements of Allied Expeditionary Forces operating in these countries the policy was therefore, not to use locally denominated Allied Military currencies, but to work out arrangements with the governments concerned for the advance production of special or supplementary issues of their respective national currencies. With the concurrence of the French National Committee of Liberation a special issue of supplementary French franc notes was produced in the United States while the refugee governments of Belgium and the Netherlands arranged to have stocks of Belgian franc and Dutch florin notes prepared in England. Supplies

of these national currencies were placed at the disposal of SHAEF, through whose G-5 Country Currency Section as custodians amounts were transferred as requested to disbursing officers or paymasters of the various Allied Forces. Whenever advances were made to U.S. Army or Navy disbursing officers these were reported by radio to Washington and equivalent dollars charged to relevant War and Navy Department appropriations, were earmarked in special accounts, and periodically made available to the currency supplying governments in amounts equivalent to the net pay of troops expended in these local currencies through civilian channels.

The issues of French, Belgian and Netherlands currency notes produced abroad and brought in by the Allied forces and repatriated governments are not, properly speaking, military currencies. They constitute rather supplementary additions to the regular national currencies in circulation at the time of enemy withdrawal, except to the extent that certain larger denominations of the latter have been replaced by the new notes under the currency conversion and blocking programs instituted in Belgium and Luxembourg. Full legal responsibility for and control of these currencies rests with the governments of the liberated countries.

Germany:—In the invasion of Germany, the Allied forces (including those of the USSR) used specially prepared Allied military authority notes, denominated in marks, for the pay of troops and local procurement. The military rates of exchange used in the pay of troops were ten marks to the dollar and forty marks to the British pound. In localities from which cash reserves of *Reichsmark* currency had been removed by the retreating enemy, local requirements might be temporarily met by advances of Allied military marks to banks under Allied Military Government control.

Pacific Areas:—In the vast task of recovering the Pacific island territories overrun by the Japanese after Pearl Harbor, U.S.

forces necessarily employed many different kinds of currencies. In the invasion of the former Japanese mandated island groups (Marianas, Marshalls and Carolines) where such currency as was in local circulation consisted of regular Japanese yen, American forces used as spearhead currency the so-called Hawaiian dollar notes. These consisted of U.S. Silver certificates and Federal Reserve Bank of San Francisco notes bearing a brown seal and the imprint "Hawaii." Those notes were originally prepared in the United States and rushed to Hawaii immediately after Pearl Harbor to replace regular U.S. currency which under the threat of Japanese invasion had been taken up under receipt from holders in Hawaii, concealed and later destroyed as it was replaced by Hawaiian dollar currency.

In the invasion of former Australian administered islands (British New Guinea, New Britain, Bismarcks), American forces used Australian pounds purchased from the Commonwealth Bank of Australia. In Netherlands New Guinea our troops were paid in Netherlands East Indies guilders, advanced by the Netherlands authorities on a basis similar to that worked out with the refugee governments of Western European countries.

General MacArthur's forces and the repatriated Philippine Commonwealth Government brought with them a new Victory Series of the Philippine Treasury certificates and new Philippine coins for use in the recapture of the Islands.

Initial financing in the occupation of the home islands of Japan and Korea was by means of military yen but the latter were very soon supplemented by regular yen received from the Bank of Japan and the Bank of Chosen.

Editor's note: The following is an extract from a letter by Mrs. Marguerite Patton which accompanied the above manuscript.

"Colonel Patton was accidentally killed on September 1st 1945 and the article as now submitted is exactly as he had written it. He planned to add a summary and concluding paragraph but no attempt has been made to have such a paragraph added by someone else."

Handling Engineer Supplies for Air Force Units

MAJOR CHARLES A. KELLER, *Corps of Engineers*
Former Instructor, Command and Staff College

THERE has been a great amount written, said and done about logistical planning and support for Air Force units and Air Force operations, insofar as Air Corps technical supplies, ordnance, chemical warfare, signal, quartermaster and medical supply and services are concerned. To date very little space and time has been given to a discussion of the engineer supply requirements of the Air Forces. This is especially true of the requirements of Air Force units other than Aviation Engineers. When it came to engineer supplies during World War II, the Air Force was caught unprepared.

The items of engineer supply cover a wide range and include everything from a steam shovel down to a hand trowel. In engineer supply you find all the items you would purchase in a hardware store such as; nails, light bulbs, electrical and plumbing supplies to mention but a few. There are also all of the builders materials such as lumber, roofing, cement and structural steel. Fire fighting supplies and equipment also occupy a prominent place among engineer items. Nearly all items of engineer supply, exclusive of heavy engineer road working equipment, are issued on a Class IV basis. This means that there are no prescribed allowances but that issues are made on the basis of need and current availability. The quantities and types of materials consumed are affected, among other ways, by the weather, stability of the situation, the terrain, type of troops and their desire and ability to provide themselves with some of the simple comforts of life.

In the matter of procurement all engineer supplies are common items for Air, Ground and Service Forces. As such, ASF (Army Service Forces) is charged with their procurement, storage and issue in coordination with the other two main forces with regard to requirement or specific items. This is bulk handling by ASF. The major forces draw

in bulk from ASF stocks and are charged with the detailed distribution to their subordinate commands and units. In the theaters of operation the ASF functions are performed by SOS (Services of Supply) or Communication Zone Headquarters, insofar as the theater is concerned. Within the theater of operations the big problem in any type of supply, is forecasting and predicting future requirements. This problem is increased in engineer supply because the items are not consumed at a uniform rate.

At the outset of the war the Air Forces were, in the main, unable to predict and furnish even reasonably accurate estimates of their engineer supply requirements to theater supply agencies for other than airfield construction. The material requirements for airfield construction were usually prepared by the Air Force Engineer and did not include the housekeeping and operational requirements of Air Force units. This oversight in planning had no noticeable effect on individual Air Force units as long as they were operating from bases in allied territory where they could secure the everyday items by applying to the allied agency that was responsible for providing all the base facilities and supplies. Once the Air Forces started operating from airfields in enemy territory, or friendly territory previously held by the enemy, the lack of adequate engineer supply planning became evident overnight.

Air Force units barely landed on a new beachhead when S-4's of the Service Groups and Air Depot Groups started to receive requests for large quantities of lumber, nails, and roofing materials. The S-4's recognized these items as being common supplies and placed requisitions for them on the nearest Army or Service Force depot. These requisitions from Air Force units were a bolt from the blue to the depots. No stocks had been ordered for Air Forces other than those required for Aviation Engineers and overall demands far exceeded stocks on most items.

The S-4's usually turned to the Aviation Engineer units hoping to get a portion of the much needed items. Here again the answer was that stocks were not large enough to meet more than construction requirements and that the Aviation Engineers could not meet the needs of other Air Force units. A compromise was generally worked out whereby bare minimum needs were met from the meager stocks on hand in the Aviation Engineer dumps and the Service Force engineer depots. Thus, the immediate requirements were met but the problem of future needs remained untouched. This problem was laid before Air Force Headquarters for solution.

From the Air Force point of view the problem encompassed the following points:

- (1) How to keep the Air Force units supplied with engineer items from existing theater stocks until increased quantities could be brought in to cover Air Force needs. This was a 90 to 120 day period, depending on order and shipping time for the theater.

- (2) How to determine future requirements when no experience or consumption records were available.

- (3) What personnel, unit or section should be charged with the responsibility for estimating engineer supply requirements and coordinating supply action with other headquarters.

The crux of the problem was the matter of experienced personnel. The Air Force Service Command was the logical organization to handle the supply problem. Within that command the Engineer Section of the special staff was the logical section to handle the problem of engineer supply for the Air Force including both Aviation Engineer and Air Force units. Personnel for the engineer supply subsection was generally recruited from the Aviation Engineer personnel that had been handling the Aviation Engineer supply requirements.

The problem of providing engineer supplies for Air Force units during the interim period, of 90 to 120 days, was usually solved by reallocating available stocks in the theater and in some cases by dipping into reserve

stocks. Needless to say, the whole matter tended to place the Air Force "in the dog house" with the supply agencies.

In tackling the problem of future requirements the engineer supply officer found himself virtually without aid. The Air Depot Groups and the Service Groups had no engineer personnel as they had quartermaster, ordnance, medical, chemical warfare and signal to handle supply. The S-4's of these groups could furnish guesses about future requirements, but no facts or figures to back up their guess. The consumption figures for Ground Force units did not apply because they were more on the move than the Air Force units who stayed in one location for long periods and had more elaborate fixed installations. The first "guesstimates" furnished theater supply agencies regarding requirements were just guesses—some items were ordered in excess, but, most items not in great enough quantity. As time went on and consumption records became available the accuracy of advance predictions increased and "guesstimating" decreased.

When it came to the pick and shovel work of actually handling supplies the big problem was in the subordinate Air Force units—the Air Depot Groups and the Service Groups. In the Service Groups there was need of someone to:

- (1) Consolidate the requirements of all units served by the groups.

- (2) Supervise drawing of the supplies from the depot and delivering them to the groups' supply point.

- (3) To supervise break down of available supplies to requesting units. This was a big job because rarely were all requisition supplies received and an equitable distribution had to be made of what was available.

In the Air Depot Group the problem was essentially the same as in the Service Group with some exceptions. According to AAF Regulations, Air Depot Groups are not charged with storage and issue of engineer supplies if there is a Service Force or Ground Force installation in the vicinity to handle this function. Quite often, however, the Air Depot found themselves in locations isolated

from Ground and Service Force installations and in such instances were forced to receive, store and issue engineer supplies without the benefit of having depot troops trained along this line. Even in normal Air Depot operations, the requirements of the depot and its operating units for engineer supplies such as lumber, nails, plumbing, and electrical supplies and fire fighting supplies, are large enough to warrant a small section to handle engineer supply within the depot. No personnel for this purpose was allotted in the table of organization for an Air Depot Group. The only ray of hope was that when Air Depot Groups were charged with operating a section to handle engineer supply an Engineer Aviation Depot Company was to be attached to the depot. Here the hitches were:

(1) Insufficient Engineer Aviation Depot Companies organized.

(2) Available units were located in the Z/I and had been organized on the basis of one per Air Force.

(3) A good percentage of the units had been formed from Class IV and V personnel and were not capable of satisfactory performing their primary mission.

When possible, these depot companies were secured to alleviate the burden of the Air Depot Groups. On the whole, however, they did not relieve the overall strain to any appreciable degree.

In order to fix responsibility and to secure coordinated effort, it was common practice to designate the quartermaster officer or the chemical warfare officer, of the Air Depot Group or Service Group, as engineer supply officer in addition to his other duties. This manner of handling engineer supply in the lower echelons was never completely satisfactory. As an additional duty for an officer of another branch of service, the job increased his work load by no little amount. The manner in which the engineer supply was handled by these officers varied from excellent to poor. Best results are obtained when the dealings between units and supply agencies are conducted by people of the same branch of service. It is easier for an engineer to get engineer supplies from an engi-

neer than it is for a quartermaster officer to do so.

When engineer personnel became available they were often placed in the Air Depot Groups and Service Groups to act as engineer supply officers and thereby improve the supply chain.

The channels followed by requisitions for engineer supplies, from using unit to the supplying depot varied from theater to theater and often differed in various parts of the same theater. The effort was, always, to simplify the channels as much as possible but to still retain some control of issues.

Once it became apparent that Service Groups and Depot Groups had to handle engineer supplies, regulations were changed and they were charged with providing engineer supplies to all Air Force units exclusive of Aviation Engineers. The Tables of Organization for the Air Material Squadron of the integrated type Air Services Group and the proposed integrated type Air Depot Group include personnel to handle engineer supply and charges these organizations with the responsibility for engineer supply.

We have reviewed the general situation regarding the personnel angle of handling engineer supplies in the Air Force. Let us now look more closely at the supply requirements.

Air Force technical supplies are comprised largely of sensitive instruments, highly machined and easily damaged parts and items that must be protected from the elements by careful packing. Air Depot receive these items in bulk and re-issue them to Service Groups in smaller quantities—here is where some of the engineer requirements start. First of all, extensive binning is required for segregation of parts. The construction of bins requires large amounts of lumber, nails, and hardware not to mention electrical supplies to provide adequate lighting. An average Air Depot requires several million board feet of lumber for this purpose alone. Next is the need for packing and crating materials for packing shipments of supplies to the Service Groups or shipment

of repairables to the Zone of the Interior. A portion of this material can be salvaged from the boxes that contained the bulk of shipment to the depot, but, the major portion must come from engineer stocks. This is a continuing need and an average Air Depot will consume half a million board feet upwards each month with a proportionate amount of nails (about 45 pounds of nails per 1000 board feet of lumber). Going to the Service Group we find they too require some binning and storage space for supplies. Their requirements are considerably less than those of the Air Depot but must be met. Here again there is a need for packing and crating materials for shipping repairable and salvageable items back to the depot. Containers in which new parts were received can be used to send back the old parts but do not meet the demand because the flow of salvage and repairables to the rear is greater than the flow of parts forward. This seemingly strange situation is due to the fact that complete aircraft are flown forward but when the aircraft is salvaged the component parts have to be shipped back in boxes. Normal requirements of lumber for this purpose varies but will average 15,000 to 30,000 board feet per month per Service Group.

Thus far only the packing and crating requirements for Air Corps technical supplies have been mentioned. Similar demands for like materials are presented by the Air Force ordnance, signal, quartermaster and other technical supply agencies.

In addition to the above requirements there are demands for electrical and plumbing supplies and fire fighting supplies. Each airfield is a semi-permanent installation and troops are often stationed there as much as a year or year and a half without moving. This has its repercussions on engineer supplies in that the units endeavor to improve their living conditions by installing showers, running water and complete electrical systems. When the units do move much of this material must be abandoned because of time required to salvage it or because of lack of transportation. When the unit reaches a

new location the construction repeats its cycle.

Large quantities of drafting and reproduction supplies are consumed at all echelons for statistical control activities, map rooms and the like. Last but not least are the normal replacements required for hand tools of types that become lost, worn out and salvaged.

Taken individually, by separate units, the requirements seem small but when lumped together at Service Group level they present a good sized headache. At Air Depot Group they represent a major task. At Air Force Service Command level they create a logistical problem.

In summarizing the situation of engineer supply in the Air Forces we might say the following:

(1) In the pre-war period and during the early stages of World War II, the matter of engineer supply for Air Force units was not given adequate thought and consideration

(2) The need for engineer logistical support was recognized by the Air Forces when they began operations from bases in territory that had formerly been in enemy hands.

(3) In order to meet the requirements of engineer supply and of supply personnel, improvised and consequently, generally inefficient supply systems were established in all theaters of operation.

(4) The need for an efficient manner of handling engineer supplies was recognized to the point that the Tables of Organization for the new integrated Air Service Group and the proposed integrated Air Depot Group now include personnel to handle engineer supplies. These units have as a part of their mission, the provision of engineer supplies to all Air Force units exclusive of Aviation Engineers.

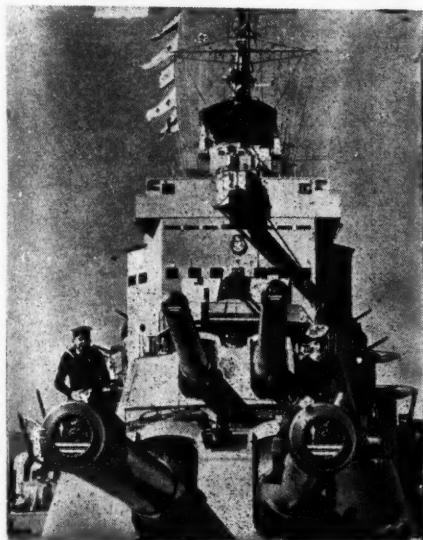
The author hesitates to make any recommendations for further improvement of engineer supply in the Air Force until the new type Service Groups and Air Depot Groups have had a fair and thorough test. It is believed, however, that the experience gained by the Air Forces during the war will be forgotten and that engineer supplies will be given due consideration in the future.

MILITARY NOTES

AROUND THE WORLD

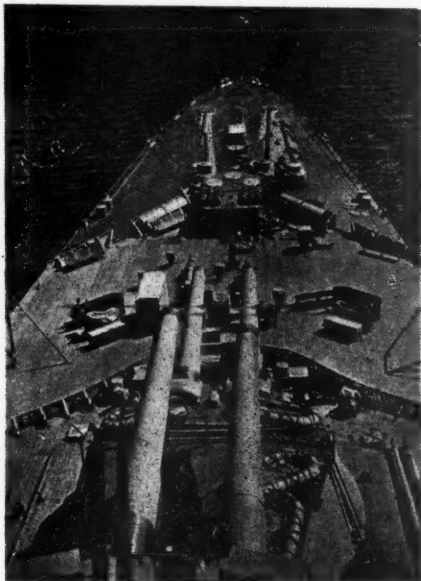
GREAT BRITAIN

Britain's Biggest Antiaircraft Battleship:



gree of protection for the carriers in action. The effectiveness of *Vanguard's* antiaircraft armament is enhanced by the installation of the latest radar and fire-control equipment, the guns being remote controlled, and laid, trained and aimed automatically from a master-sight.

(*The Sphere*, Great Britain)



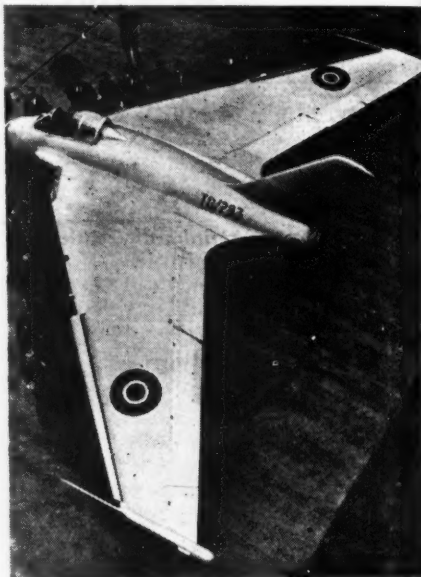
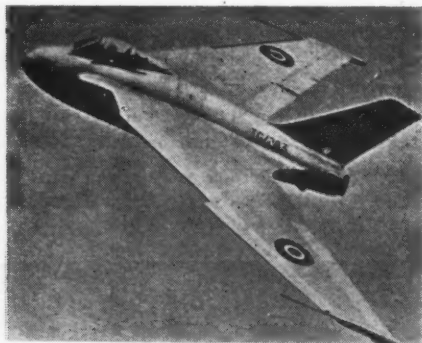
HMS *Vanguard*, Britain's newest and most powerful battleship, has been designed essentially for an antiaircraft role. In addition to her main armament of eight 15 inch guns, the *Vanguard* has sixteen 5.25-inch guns mounted in twin turrets and capable of low-angle and high-angle fire. The battleship is thus equipped to accompany an aircraft carrier task force and provide a high de-

A British Tailless Jet Plane:

Not to be confused with the Flying Wing type of aircraft the revolutionary De Havilland experimental aircraft illustrated on this page was designed to explore the problem of controlling high-speed aircraft with back-swept wings, which permit higher speeds than the ordinary type of wing. Known as the D.H. 108 Swallow, it is the first tailless jet-propelled aircraft ever to have flown. The project was begun last October, and the prototype—a standard Vampire fuselage fitted with the new type of wing—first flew on 15 May. Subsequent trials at Woodbridge,

Suffolk have proved successful. The Swallow is intended for speeds of 675 miles per hour or more.

(The Illustrated London News)



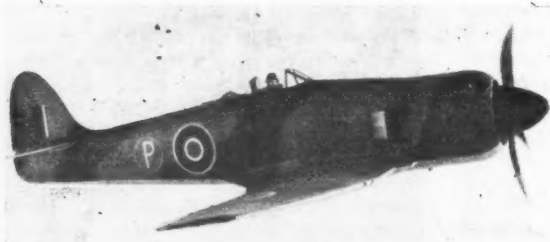
Hawker Fury

Designed to meet the most exacting military and naval specifications, the new Hawker Fury, now being built in quantities for the fighting services, is an outstanding addition

to the long line of its famous forebearers.

The pilot's position has been raised to give improved views both forward and downward. The special high-speed section developed by

Hawkers gives excellent characteristics over the whole speed range, and the Fury has no vices near the stall, though it was primarily designed for high-speed conditions. Because there are no sharp changes in pressure gradients, the onset of compressibility effects are delayed and very high speeds may be attained without any adverse effect on stability or control.



The slightly upswept top line of the fuselage, which provides the good view for the pilot, combined with the facility with which the Fury handles in the air, renders flying near the ground easy at all speeds, so that a steady and straight approach can be maintained. Handling characteristics near the stall are good, enabling full lateral and longitudinal control to be retained. The new fighter is one of the fastest in the low to medium altitude range, while its cleanness of line promotes wide radius of action at high cruising speeds.

(*The Aeroplane*, Great Britain)

AUSTRALIA

Meteor Flies at 480 miles per hour:

The fastest flight in the history of Australian aviation was made in Melbourne recently when a Gloster Meteor jet-propelled fighter reached 480 miles an hour. The plane had been brought to Australia from Britain with three other jet-propelled planes for tests under Australian operating conditions. The test flight lasted about an hour and the plane reached a height of 20,000 feet. The test pilot said that the performance of the machine was satisfactory in all respects. After further tests in Victoria, the plane will be sent to the north of Australia for tests under tropical conditions.

(*Australian News Summary*)

GERMANY

Liquidation of the Luftwaffe:

The two main tasks of the RAF in Germany are the disbandment of the *Luftwaffe* and the destruction or disposal of its equipment and factories. Both tasks are expected to be completed within the next few months.

One interesting feature of the disarming of the *Luftwaffe* is the great quantity of poison-gas bombs and shells found. It is estimated at about 400,000 tons in the British

sector alone. Thousands of rockets and flying bombs have been discovered, a great many of the latter adapted to be flown by a "suicide" pilot.

The RAF disarmament section has discovered 6,589 dumps of various kinds of weapons and equipment, besides factories and workshops which had worked for the *Luftwaffe*. The armament disposal section has destroyed or made harmless over 93,000 tons of explosives, ranging from V-weapons to anti-personnel bombs, 84,000 tons of small arms and machine guns, tens of thousands of rounds of ammunition, and 1,200 tons of miscellaneous equipment. From this total some 32,000 items of equipment have been sent to England for intelligence and experimental purposes.

(*The Times Weekly Edition*, Great Britain)

The Anti-Nazi PW Returns:

Carefully selected and thoroughly trained in the ways of democracy, former prisoners of war may now help reorient their fellow Germans. Several thousand have been shipped from the States to Germany, trained in the concepts of American democracy and prepared to take many of the positions vacated by the denazification program.

These men were selected for exposure to democracy because it was learned through screening that they had a natural anti-Nazi attitude. But merely being anti-Nazi doesn't mean they could help rebuild Germany into a democratic country . . . they had to know how. So in Fort Getty, and Fort Whetherhill and elsewhere, schools were established to teach democratic fundamentals, procedures, and democratic forms of government. In the schools the PWs had an opportunity to study under some of our best college professors, the democratic way of life, its privileges and benefits, and its responsibilities. In addition, these battle-born students were able to see democracy in operation through films, radio, newspapers, and to a limited extent, through direct observation. Every opportunity was given them to realize that democracy actually

lives and breathes—that its application is not limited to classroom or textbook work.

These men are registered and screened in accordance with the denazification laws, then placed on jobs through local labor offices.

For ease of rapid identification, each United States-trained prisoner carries an identification card distinguishing him from ordinary veterans.

(Weekly Information Bulletin)

UNITED STATES

Infrared Weapons:

One of the most amazing pieces of equipment to come from the war is the "Sniperscope." Primarily a night-fighter, the Sniperscope is one of the family of infrared weapons which are as unusual as their name implies.

The Sniperscope was developed late in 1943 and was used in the Pacific during the 1944-45 campaigns particularly to prevent Japanese troops from infiltrating behind our lines.

The Sniperscope, as do the rest of the infrared units which were developed, uses the principle of sight without light. Infrared has been known for many years to have the

power of penetrating mist and the darkness of night.

It has been used extensively for photographic work under adverse weather conditions. One of its many uses is the "infrared sextant," a sextant capable of piercing fog or haze, enabling the ship to "shoot the sun" and check its longitude and latitude.

The infrared units developed for ground troops are a step further along this line. Very simply, they work like this. The infrared unit, consisting of a light source and a telescopic viewer, is mounted on a weapon. The light source, which looks like a black spotlight, emits an infrared light which shines on enemy personnel and the reflected image of the foe is picked up by the viewer. The infrared armed man need only sight in on the image in the viewer and squeeze the trigger. The image, of a greenish hue, is remarkably clear as to details.

The use of infrared weapons was started simultaneously in Germany, Japan and the United States. The Germans made unusually large light sources and telescopic viewers, mounting them mostly on half-tracks and tanks.

Infrared units may be mounted on shoulder weapons, field pieces, helmets for jeep, truck

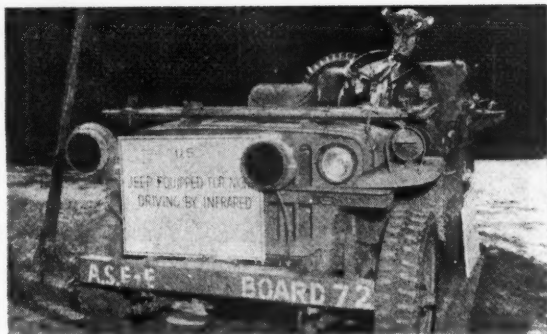


Infrared equipment on small arms.

or tank drivers—in short, on almost anything. The placement of the units enjoys complete freedom in that enemy troops are incapable of detecting the infrared light with the naked eye.

When jeep mounted, the infrared light sources are placed between the two headlights. The regular headlights of the jeep are not used when the infrared unit is being employed. The driver of the jeep wears an over-sized helmet which has a telescopic viewer before each eye. Thus, when looked through, the images blend together, forming one complete image.

When mounted on a half-track, a huge light source approximately thirty inches in diameter is employed. The telescopic viewer is about the size of a normal telescope. This light may be used to direct antiaircraft fire, search surrounding terrain, or locate enemy activity. The large infrared unit on the half-track is not used to assist the driver of the vehicle, since he is equipped with his own in-



Jeep and driver equipped for night driving.

riety of weapons including the carbine, the M1 rifle, the Browning automatic rifle or the .50 cal. machine gun. When mounted on the M1 rifle, a special leather cheek rest is required. On a shoulder weapon, the light source, which is about six inches in diameter, is placed under the upper hand guard. The telescopic viewer is attached onto a special holder situated on the left side of the rifle, directly across from the bolt and in line with the leather cheek rest.

The principal part of the infrared unit is the image tube. This tube, about the size of an ordinary radio tube, transforms the invisible infrared rays into a readily discernible image.

(*Marine Corps Gazette*)



The Germans equipped half-tracks with infra-red searchlights.

frared unit consisting of headlights and the helmet.

The infrared unit may be mounted on a va-

New Camera Plane:

Based on its war-famous *Black Widow*, Northrop Aircraft has developed the F-15 *Reporter*, versatile camera plane with a speed of more than 400 miles per hour. Designed during the closing phases of the conflict and war-late in production, the plane showed so much promise in high and low-altitude photography that a \$7,500,000 contract for 175 units was given and now is being filled. The basic design mounts six cameras, and alternate arrangements will permit the mounting of eleven different types of cameras. What is said to be the largest piece



of plexiglass ever blown (see below) gives the *Reporter* a massive, bubble canopy providing the plane's two-man crew 360° vision. The plane has a range exceeding 4,000 miles, and a ceiling in excess of 35,000 feet. It is powered by two Pratt & Whitney R-2800-C engines equipped with turbosuperchargers.

(Aviation News)



A Cure for Cholera:

What is described as "a complete cure for one of mankind's oldest and most deadly

enemies, cholera, was developed by United States Navy epidemiologists in a controlled experiment held during a recent epidemic in Calcutta.

The work was undertaken to seek protection for thousands of Americans stationed in India, China, Burma, Ceylon, and the Philippines, where annually the disease rages in epidemics. There was only vaccination against this disease and that was not a sure preventive. There is now tested knowledge that through the proper use of blood plasma, sulfadiazine and saline solution "no one need die of cholera." 100 per cent recovery is assured according to the Marine Corps.

(From a news report)

The FDI Phantom:

The Phantom—or FDI as it is officially called—is the first United States Navy



fighter to be powered exclusively by jet engines, and on trials it has registered speeds in excess of 500 miles per hour. The phantom has a polished aluminum alloy skin designed to help reduce wind resistance, and it is remarkable for its light weight, just over four tons with full combat load. The range of the plane is about 1,000 miles. A high cockpit gives the pilot a first-rate view when engaged

in patrol activities over the sea.

(*The Sphere*,
Great Britain)

FOREIGN MILITARY DIGESTS

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21st (British) Army Group in the Campaign in Northwest Europe, 1944-45

Digested at the Command and Staff College from an article by Field Marshal Sir Bernard L. Montgomery, in "Journal Royal United Service Institution" (Great Britain) November 1945.

It is essential to say that in modern war every operation is combined. In the initial stages of this campaign the object was to secure a lodgment on the continent from which further offensive operations could be developed; this was clearly a combined operation of the first magnitude.

Before the operation was launched it was the task of the air forces to create conditions favorable to a successful landing and to the subsequent development of operations inland. Both the Army and the Navy relied on this being done, and it was done; the heavy bombers of Bomber Command and of the American Air Force did magnificent work in weakening Germany generally, and particularly in destroying the enemy railway system, which enormously reduced the mobility of the enemy once operations began.

Until the Army stepped ashore it was completely in the hands of the Navy and Air Forces for its sea and airborne landings.

Once the Army was on shore all military operations became combined army/air operations; the mighty weapon of air power enabled the Army to conduct its operations successfully and with far fewer casualties than would otherwise have been the case. The Army relied on the Navy and on the Air Forces for secure communications across the sea from our island base in Britain.

This campaign involved the whole problem of the conduct of offensive operations on land in Western Europe with the final object of destroying the enemy's armed forces and occupying Germany. Therefore, the first need was to decide how the operations on land were to be developed so that the object could be attained in the simplest and quickest way. It was then for the Navy to say whether the Army could be put on shore in such a way that the land battles could be developed in the required manner; and it was for the

Air Force to say whether this would suit the air plan. And so the combined plan was built up; some compromise was necessary but eventually, and very quickly, an agreed plan emerged.

The Plan

The intention was to assault, simultaneously, beaches on the Normandy coast immediately north of the Carentan estuary and between the Carentan estuary and the River Orne, with the object of securing as a base for further operations a lodgment area which was to include airfield sites and the port of Cherbourg. The left or eastern flank of the lodgment area was to include the road center of Caen.

Once ashore and firmly established, my plan was to threaten to break out on the eastern flank—that is in the Caen sector; by this threat to draw the main enemy reserves into that sector, to fight them there and keep them there, using the British and Canadian Armies for the purpose. Having gotten the main enemy reserves committed on the eastern flank my plan was to make the break-out on the western flank, using for this task the American Armies under General Bradley, and pivoting on Caen; this attack was to be delivered southwards down to the Loire and then to proceed eastwards in a wide sweep up to the Seine about Paris. This would cut off all the enemy forces south of the Seine, over which river the bridges were to be destroyed by air action. The general plan was given to the general officers of the field armies in London in March 1944—that is, three months before D-day. The operations developed in June, July and August exactly as planned. I had given D+90 as a target date for being lined up on the Seine; actually the first crossing of the river was made on D+75.

Why did we select the Normandy beaches?

They offered a better shelter for shipping and were less heavily defended than other possible beach areas along the Channel coast. They satisfied the minimum requirements of the Air Forces, in terms of their distance from home bases, for the provision of air cover. The absence of major ports was overcome by the gigantic engineering feat of constructing two artificial ports in the United Kingdom which were towed across the Channel in sections and erected, one in the United States sector and one in the British sector.

The invasion operations may be said to have begun with the action of the Air Forces. The first stage was the winning of the air battle, an essential preliminary to all major offensive operations. This task was admirably accomplished.

The Assault

My plan of assault, as approved by the Supreme Commander, provided for simultaneous landings by three British and two Canadian brigades, and three American combat teams. With the assaulting brigades, two battalions of U.S. Rangers and portions of two British commando brigades took part.

Airborne forces were used on both flanks. On the right, the 82d and 101st U.S. Airborne Divisions dropped at the base of the Cotentin peninsula to assist in capturing the beaches and isolating Cherbourg. The 6th British Airborne Division was given the task of seizing the crossings over the Caen Canal and of operating on our extreme left.

The first task of General Bradley's forces was to cut off the Cotentin peninsula and seize Cherbourg. Operations would then develop southwards. The British forces, under General Dempsey, were to make straight for Caen to establish the pivot.

It is important to mention the subject of build-up. I considered it essential for the success of initial operations to have ashore and ready for action by the end of D+3, seven divisions together with the necessary proportion of armor, quite apart from the airborne troops. With these forces I was confident of being able to defeat the first Ger-

man attempts to dislodge our forces and also of being able to retain the initiative.

The Battle of Normandy

The assault on the beaches of Normandy began on 6 June 1944. Airborne forces were dropped first; then from a mighty armada of ships and craft, preceded by a tremendous weight of bombing from the air, American, British and Canadian troops set foot again in France.

Despite the enemy's plan to defeat us on the beaches, there were no surprises awaiting us, and our measures for overcoming the formidable array of obstacles and beach defenses were effective. The secrecy of our operations, and the special measures taken to mislead the enemy, had achieved a great measure of tactical surprise—and in the circumstances we could not hope for more. Moreover, our losses were lighter than we had expected.

Within a week the beachheads had successfully linked up, and along the continuous front Allied troops were engaged in heavy fighting. Adequate stocks of ammunition and supplies had been accumulated, and our build-up was proceeding well. We had gained a strong foothold; we had suffered no setbacks.

The Break Out

In early July, the First U.S. Army was gaining position for the break-out from the initial lodgment area. Operations centered in the La Haye du Puits sector and in the capture of St. Lo. Meanwhile, the business of locking up the enemy armor on the eastern flank continued.

Preceded by a highly successful bomber raid, when for the first time aircraft of Bomber Command operated on the tactical battlefield, we entered Caen on 9 July. In order to increase the enemy's anxiety in this sector by threatening armored action in the open country southeast of Caen, I now withdrew three armored divisions into reserve. The enemy responded suitably; the bulk of his armor remained where we wanted it.

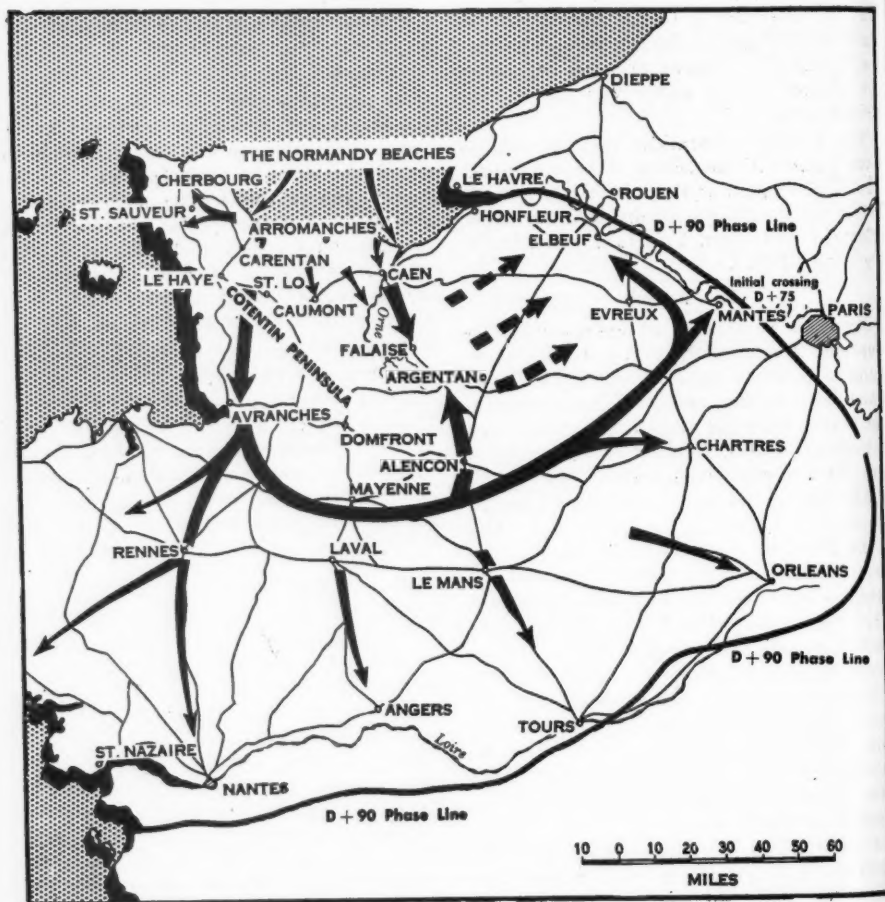
The Second British Army now extended its front farther west in the Caumont sector

in order to increase the striking force available to the First U.S. Army. The First Canadian Army took over responsibility for the extreme left sector on 23 July. The stage was thus set for the break-out from the western flank.

On 25 July the main American attack

leading troops as a preliminary to their advance. The advance was highly successful; Avranches was taken on 30 July.

By 6 August the area: Laval—Mayenne—Domfront had been reached and on the following day the First Canadian Army, which had now extended its front to include the



The Battle of Normandy.

started in the sector between Periers and St. Lo. The Eighth U.S. Air Force was employed in the tactical role and dropped a carpet of bombs immediately in front of the

Caen sector, began a series of major attacks astride the Caen-Falaise road.

This was an exciting time, as it was now to become apparent whether the enemy would

stand and be defeated between the Seine and the Loire or whether he would endeavor to withdraw his forces behind the Seine. Between 7 and 11 August it became clear that he had decided to fight the Battle of France on our side of the Seine. A major counter-attack employing up to six armored divisions was launched on Hitler's orders against the American forces in the area of Mortain. It was designed to cut off the forces operating south of Avranches by a drive to the sea. In the face of this counterattack the Americans, assisted by the full weight of the tactical air forces, stood firm.

I ordered the right flank of the Twelfth U.S. Army Group to swing north towards Argentan, and intensified the British and Canadian thrusts southwards to the capture of Falaise. It had become a race to trap the German forces deployed in the long salient between Falaise and Mortain. Meanwhile, the enemy received a tremendous hammering from the air.

Falaise fell to the Canadian Army on 16 August; American forces had reached Argentan, and fighting of tremendous intensity was in progress at the bottleneck with the German striving all he knew to force his way out.

Speedy regrouping on the Twelfth U.S. Army Group front, combined with outstanding administrative improvisation, enabled the advance eastwards of the Third U.S. Army to continue while the battle of the Falaise pocket was still in progress. By 20 August, troops of General Patton's army reached and crossed the Seine in the area of Mantes and began to work westwards along the river towards Elbeuf. While American, Canadian, French and Polish troops held the neck of the bottle, the Second British Army and First U.S. Army, strongly supported by the Tactical Air Forces, overran and eliminated the trapped enemy. The other armies of the 21st Army Group then began the race to the Seine.

The Battle of Normandy had conformed to the pattern decided upon before D-day. There was nothing the enemy had been able to do which ever upset this plan, and there

was never a moment in which we had not firmly held the initiative. The massive counter-attack which we had always taken into consideration in our plans before the invasion never materialized in the earlier stages. The enemy had been forced to use his Panzer formations to plug holes in the line in response to our thrusts. He was not able to launch a main stroke with them until after we had broken out of our original beachhead. It was then too late.

The Drive Across the Pas de Calais to Antwerp

On 1 September, the Supreme Commander assumed command and direction of the Army Groups himself, and I was no longer, therefore, his overall land force commander.

As a result of discussions between the Supreme Commander and myself, from now on the eventual mission of the 21st Army Group became the isolation of the Ruhr. The urgent problem was to prevent the enemy's recovery from the disaster sustained in Normandy.

The immediate tasks of the 21st Army Group were:

- (a) the destruction of the enemy in northeast France,
- (b) the clearance of the Pas de Calais with its V-bomb sites,
- (c) the capture of airfields in Belgium, and
- (d) the capture of Antwerp.

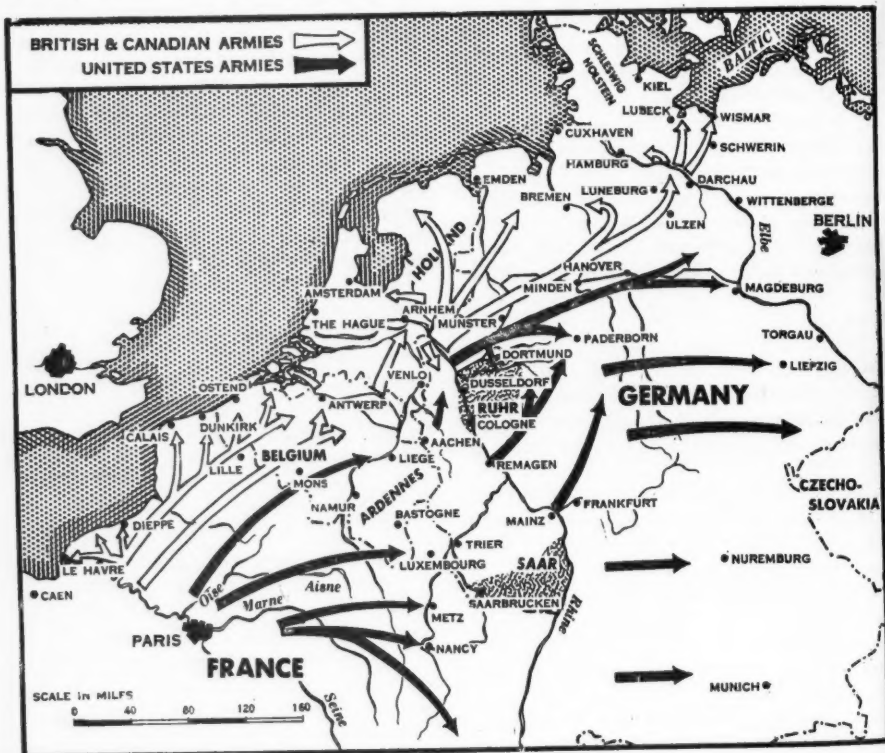
The 30th Corps was the spearhead of the British drive to the north. Amiens was reached on 31 August, Brussels was entered on 3 September, and the city of Antwerp on the following day. This advance imposed a considerable strain on administration. We were maintaining our spearheads some four hundred miles from the temporary base in Normandy. The greatest strain was thrown on road transport, because only short stretches of railway were available owing to the widespread demolitions. But all difficulties were overcome, and the pace of the pursuit was maintained.

Crossing the Meuse and Rhine and Clearance of the Scheldt Estuary

The speed of our advance through the Pas

de Calais and into Belgium convinced me that if the Allies could concentrate and maintain sufficient strength for the task, one powerful thrust deep into Germany would overwhelm the enemy and carry with it decisive results. The best axis along which such a thrust could have been developed was the route north of the Ruhr leading to the plains of northern Germany. It was

and Cherbourg peninsula, and the autumn weather was close upon us. He therefore decided that the early opening up of deep-water ports and the improvement of our maintenance facilities were pre-requisites to the final assault on Germany proper. He directed that our immediate aim should be the establishment of bridges over the Rhine throughout its entire length, and that we



The Seine to the Baltic.

obvious that the enemy would concentrate strong forces to defend this vital axis, and the industrial area of the Ruhr.

The Supreme Commander came to the decision that we should not at this stage stick out our necks in one single thrust deep into enemy territory, owing to our lack of major deep-water ports. The lines of communication still stretched to the Normandy beaches

should not go beyond this until Antwerp or Rotterdam could be opened. In view of the time factor it was agreed that the 21st Army Group should launch its thrust to the Rhine before completing the clearance of the Scheldt estuary.

I ordered the resumption of the Second Army advance from the Antwerp-Brussels area for 6 September, and by 11 September

a bridgehead was established over the Meuse-Escout Canal. It was already noticeable that the enemy was beginning to recover his balance, so that the urgency of launching the thrust to the Rhine was underlined.

On Sunday 17 September, the Battle of Arnhem began. The purpose was to cross the Meuse and the Rhine and place the Second Army in a suitable position for the subsequent development of operations towards the northern face of the Ruhr and the north German plains. The thrust to Arnhem outflanked the northern extension of the West Wall, and came very near to complete success.

The essential feature of the plan was the

effect a very rapid concentration of forces to oppose us, and particularly against the bridgehead over the Neder Rijn. In face of this resistance the British group of armies in the north was not strong enough to retrieve the situation created by the weather by intensifying the speed of operations on the ground. We had not the divisions to widen the corridor sufficiently quickly to re-inforce Arnhem by road.

On 25 September I ordered withdrawal of the gallant Arnhem bridgehead. We retained the vital crossings at Grave and Nijmegen, and their importance was to be amply demonstrated.



Nijmegen Bridge after its capture by American troops and British Armor, September 1944.

laying of a carpet of airborne troops across the waterways from the Meuse-Escout Canal to the Neder Rijn, on the general axis of the road through Eindhoven to Uden, Grave, Nijmegen, and Arnhem. The airborne carpet and bridgehead forces were provided by two American and one British airborne divisions and a Polish parachute brigade. Along the corridor, or airborne carpet, the 30th British Corps was to advance and establish itself north of the Neder Rijn with bridgeheads over the IJssel facing east.

Full success at Arnhem was denied us for two reasons. First, the weather prevented the building up of adequate forces in the vital area. Second, the enemy managed to

On the central sector of the Allied front, by the middle of September, the First and Third U.S. Armies were fighting on the Siegfried Line from the Aachen area through the Ardennes to the region of Trier and southwards along the general line of the upper Moselle. By the third week in September the Sixth U.S. Army Group which had landed at Marseilles was firmly deployed on the right of the Twelfth U.S. Army Group and the Allied front was continuous to Switzerland.

Operations to open up Antwerp

The enemy had achieved a measure of recovery. This was clear not only in the Arnhem operation, but also in his reaction to American thrusts in the Siegfried Line. We had to prepare for a hard killing match before we could secure the Ruhr and advance into Germany. We had also to open the approaches to Antwerp before winter set in. The immediate intention therefore became the clearance of the Scheldt estuary.

This task was given to the First Canadian Army and lasted through October to the first week in November. The enemy resistance was vigorous, and some very hard fighting took place, leading up to the final operation for the capture of Walcheren. The reduction of this fortress presented many novel prob-

lems. These were overcome principally by very remarkable precision bombing by Bomber Command, which breached the dikes and submerged large areas of the island. The extensive use of special amphibious devices enabled our troops to operate in the resulting floods.

Preparations for the Battle of the Rhineland

This phase I call "the preparations for the battle of the Rhineland"—I refer to that part of the Rhineland falling in the 21st Army Group zone. These operations enabled us to economize forces by basing the front on the Meuse obstacle, and ensured a friendly western flank for the battle to follow.

To facilitate the Second Army operations, I transferred the responsibility for the Nijmegen bridgehead to the Canadian Army on completion of the Scheldt operations. This regrouping had a further object: the First Canadian Army was required to plan the battle of the Rhineland which was to be launched from the Nijmegen area; the Second British Army was to plan the subsequent assault across the Rhine.

Plans for the regrouping of the 21st Army Group for the battle of the Rhineland were completed by early December. We had reached the stage when some divisions were actually on the move to their new concentration areas when, on 16 December, the German counter-offensive in the Ardennes broke. Our plans were postponed.

The Battle of the Ardennes

The full weight of the German counter-offensive in the Ardennes was not immediately apparent. Extremely bad weather had precluded satisfactory air reconnaissance, and the German concentration had been carried out with a high degree of secrecy. However, by the 19th the full implications of the German attack were established. It was known that the Sixth S.S. Panzer Army was thrusting in a northwesterly direction towards Liege, with the Fifth Panzer Army in a wider wheel on its left. The Seventh German Army was in support. On the same day the Supreme Commander entrusted to me tem-

porary command of the First and Ninth U.S. Armies (with effect from the 20th), as they were at that time on the northern side of the German salient and therefore remote from the Twelfth U.S. Army Group axis.

On the 19th I ordered General Dempsey to move the 30th Corps west of the Meuse to a general line from Liege to Louvain, with patrols forward along the western bank of the river between Liege itself and Dinant. This corps was thus suitably placed to prevent the enemy crossing the river, and could cover the routes from the southeast leading into Brussels. It subsequently became necessary in connection with the regrouping of the American First Army to send some British divisions east of the Meuse. But throughout the battle I was anxious to avoid committing British forces more than was necessary. Had they become involved in large numbers, an acute administrative problem would have resulted from their lines of communication crossing the axis of the two American armies. Moreover, it was foremost in my mind that as soon as we had defeated the German attack we should return to the business of the Rhineland battle as quickly as possible.

The Battle of the Ardennes was won primarily by the staunch fighting qualities of the American soldier, and the enemy's subsequent confusion was completed by the intense air action which became possible as weather conditions improved. The Sixth S.S. Panzer Army broke itself against the northern shoulder of the salient while the Fifth Panzer Army spent its drive in the fierce battles which centered on Bastogne. Regrouping of the First and Ninth U.S. Armies, assisted by British formations, made possible the rapid formation of a reserve corps of four U.S. divisions under General Collins. The action of this corps, coordinated with the drive from the south by General Patton's Third U.S. Army, pinched the enemy forces out of the salient and began the bitter struggle which was to push them out of the Siegfried Line.

The enemy had been prevented from crossing the Meuse in the nick of time. A detailed

study of the battle would show how rapid regrouping enabled the Allies to regain the initiative which the enemy had temporarily seized. Once we were sure of the Meuse crossings it became increasingly apparent that the opportunity had come to turn the enemy's position to our advantage. Hitler's projected counteroffensive ended in a tactical defeat, and the Germans received a tremendous battering. As soon as the situation had been restored I was able to order the British divisions north again to the concentration areas which had been made ready in December.

The Battle of the Rhineland

The main objective of the Allies on the Western Front remained the Ruhr. Once the Ruhr had been isolated from the rest of Germany, the enemy's capacity to continue the struggle would quickly peter out. Beyond this, the object of our operations was to force mobile war on the enemy by developing operations into the northern plains of Germany. We therefore decided to line up on the Rhine; then to bridge the river and gain a suitable jumping off position for a mobile campaign in the spring. The enemy was in a very bad way; he had suffered another major defeat with heavy losses in men and equipment. Moreover, the great Russian winter offensive was now under way, and we did not wish to give the enemy the chance to switch forces to the east.

The Supreme Commander's orders to the 21st Army Group provided for a line-up on the Rhine from Dusseldorf northwards. The Ninth U.S. Army remained under my operational control.

First, we had to eliminate the enemy salient west of the River Roer between Julich and Roermond. The Second Army completed this task by 28 January. The divisions concerned, less defensive troops left holding the river line, immediately started north to join the concentration for the Rhineland battle.

The Battle of the Rhineland was based on two converging offensives between the Rhine and the Meuse with the object of destroying the enemy forces masking the Ruhr. It was intended, by interdiction from the air and

by employing the maximum available forces on the ground, to prevent the enemy withdrawing to the east bank of the Rhine.

The First Canadian Army was ordered to launch an attack southeast from the area of the Nijmegen bridgehead to meet the Ninth U.S. Army, whose thrust was developed from the Julich-Roermond sector northwards. It was originally planned to launch the two operations almost simultaneously, but the southern thrust was delayed. As it turned out, this proved to our advantage.

On 8 February the northern wing of the pincer movement started. The 30th Corps, under command of the First Canadian Army, launched its attack into the Reichswald Forest and the northern extension of the West Wall on a front of five divisions, supported by very considerable air forces and over 1,000 guns. This began the memorable battle which, in intensity and fierceness, equalled any which our troops experienced in this war. The Germans quickly built up to about eleven divisions, including four parachute divisions and two armored divisions. In particular their paratroops fought magnificently.

On 23 February the Ninth U.S. Army commenced its attack northwards towards the area where the First Canadian Army was fighting. Owing to the delay in starting the southern thrust, the Reichswald battle had drawn enemy strength from the Ninth U.S. Army sector. The Americans took every advantage of this opportunity and advanced with admirable speed; their action in its turn eased the pressure in the north.

As the Ninth U.S. Army swung north, the First U.S. Army was made responsible by the Supreme Commander for the security of its southern flank; the thrusts towards Cologne were thus related directly to our operation.

On 3 March the two armies linked up, but it was not until the 10th that the enemy bridgehead covering Wesel was liquidated. The 21st Army Group was now lined up on the Rhine as far south as Dusseldorf.

The Battle of the Rhine

The quicker we could engage the enemy in

mobile warfare in the north German plains, the sooner the end would come. While the Battle of the Rhineland was proceeding, the details for the crossing of the Rhine were being worked out. Many engineering and administrative preparations had been initiated back in December, before the Ardennes counteroffensive. In particular, work had started on the roads and railways necessary to establish our lines of communication across the Meuse and Rhine. We had furthermore stocked the Second Army depots with some 130,000 tons of stores for the coming operations. And so the 21st Army Group launched the operation for crossing the Rhine a fortnight after completion of the Battle of the Rhineland.

The fortnight between the end of the Battle of the Rhineland and the crossing of the Rhine was one of intense activity. Formations were regrouped and lined up in their correct positions, covered by a screen of troops holding the river bank. Dense and continuous clouds of smoke were employed to hide our intentions and final preparations.

The attack began on the night of 23 March, and by the next morning all four assaulting divisions (two British and two American) and the British commando brigade had accomplished their initial crossings between Rheinburg and Rees. The key to the crossing was the important communication center of Wesel, which was captured by the commando brigade after an intense air attack by Bomber Command. On the morning of the 24th, the XVIII U.S. Airborne Corps, with one British and one American airborne division, dropped on the east bank of the Rhine within supporting distance of our guns on the west bank.

The enemy reaction was initially strong—on the northern flank, where three parachute divisions had been concentrated. But generally speaking, his power of maneuver was greatly limited by the very heavy air interdiction which had been originated several days before the assault. The airborne troops took full advantage of his failure to launch any effective counterattack against

them and rapidly made contact with the formations crossing the river. The British and American bridgeheads were quickly joined. Some remarkable engineering feats were accomplished in working ferries and bridging the river, and it is interesting to note that the Royal Navy was well to the fore with craft which had been dragged by road all across Belgium, Southern Holland and the Rhineland.

We were now in a position to drive into the plains of northern Germany. It was a matter of great satisfaction to see how plans which had been maturing back on the Seine were reaching their fulfilment.

The Advance to the Elbe and Baltic

Within four days our bridgehead over the Rhine had been established, and on 28 March the advance to the Elbe began. On the right flank the Ninth U.S. Army was directed to the sector Magdeburg-Wittenberge. In the center the Second Army was to advance with its left flank on Hamburg. On the left, the 2d Canadian Corps, after crossing through the Second Army bridgehead, swung north along the Rhine to outflank Arnheim and open up the routes leading northwards from that area. Later, the 1st Canadian Corps assaulted across the river at Arnheim and turned into western Holland to establish a protective flank between the Rhine and the Zuider Zee.

The enemy tried desperately to assemble his remaining forces in opposition to our advance. The core of his resistance formed on the Ems-Dortmund Canal, facing the left and center of the Second Army. Bitter fighting ensued. In the meantime, in the Ninth U.S. Army sector and on the right of the Second Army, progress was rapid. By 3 April the Ninth U.S. Army had reached the Weser in the Minden area and had linked up with the First U.S. Army advancing from the Remagen bridgehead. The Ruhr was enveloped. The Ninth U.S. Army reverted to the command of the Twelfth U.S. Army Group. The two U.S. Armies proceeded with the clearance of the Ruhr and at the same time pushed forces eastwards to the Elbe.

The subsequent action of the 21st Army Group may be compared with the drive across northwest France. The German east-west lines of communication to the coast were progressively cut, and a series of right hooks were delivered to round up the enemy. The left flank formations drove up towards the coast to finish him off.

The 8th Corps of the Second Army crossed the Weser near Minden on 5 April, followed a few days later farther north by the 12th Corps, which then worked its way along the east bank in an advance that brought it to the outskirts of Hamburg. This wide turning movement loosened the enemy on the left, and while Bremen was masked from the south by the 30th Corps, a hook farther up river came in on the city from the east. Bremen fell at the end of the month.

The First Canadian Army made steady progress, and by mid-April had liberated most of northern Holland. By the same time the 1st Canadian Corps had safeguarded our flank in western Holland and isolated the large enemy garrison there.

The main drive to the Elbe continued to-

wards Luneburg, which was reached on the 18th, and our forces began to line up on the southern bank of the river masking the city of Hamburg. The Elbe was crossed on 29 April and spearheads made straight for Lubeck in order to seal off the Schleswig-Holstein peninsula. At the same time, moving by road, a U.S. Airborne Corps of two divisions, together with the 6th British Airborne Division, formed a defensive flank facing east on the line: Darchau—Schwerin—Wismar. Once across the river our operations were virtually unopposed. The plan for outflanking Hamburg by a maneuver similar to that used at Bremen was actually under way when, on 2 May, the Germans came out to negotiate its surrender. Across the Elbe the countryside was packed with a mass of German soldiers and refugees fleeing from our own advance and from that of the Russians, with whom we established contact on 2 May.

On the evening of 4 May the instrument of unconditional surrender was signed, and "cease fire" was ordered on the 21st Army Group front as from 0800 on 5 May.

The Brazilian Expeditionary Force in Italy— The Spring Offensive

Translated and digested at the Command and Staff College from an article by Major Nelson R. Carvalho in "A Defesa Nacional" (Brazil) January 1946.

In April 1945 Marshal Alexander issued a simple, significant order of the day, calling upon the forces in the Italian theater of operations for a decisive effort to attain final victory. This heralded the Spring Offensive, which was to culminate in the unconditional surrender of the Nazi-Fascist forces in Italy.

The Brazilian Division faced the Panaro River on a front extending from the southwestern slopes of Torraccia to Sassomolare, dominating the Gaggio Montano—Abetia—Castel D'Aiano route, and bounded on the west by the 371st Regiment (U.S.) and on the east by the 10th Mountain Division.

Enemy resistance had already been broken, but east of the Panaro they still held strong-

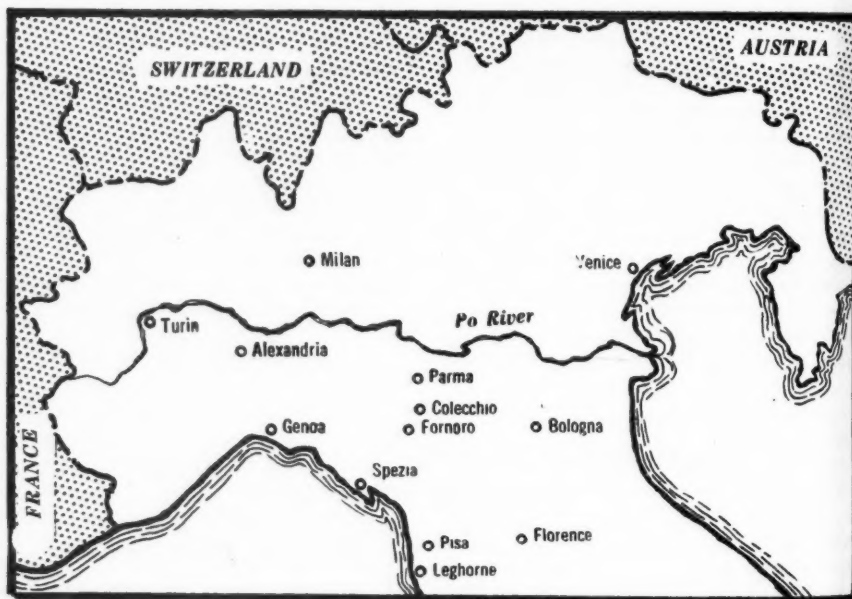
points which had to be taken since they constituted a threat to the line of communications and the west flank of the 10th Mountain Division.

The attack on Montese marked the opening of the Spring Offensive. It consisted of an initial reconnaissance in force of the heights between the line of departure and the first objective, conducted by strong patrols using mine detectors. This was accompanied by a heavy artillery concentration, attempting to give the appearance of a full-scale attack. Although the enemy reacted with infantry, mortar, and artillery fire against the line of departure and the patrols, the latter succeeded in occupying these heights.

This "screening attack" having been successfully executed, the main action, against Montese, was to be carried out. A half hour later, under a heavy preparation by our artillery, the 11th Regiment hurled its 3d Battalion into the attack, protecting it on the left with its own 1st Battalion, and on the right with the 2d Battalion of the 1st Regiment. Meanwhile American tanks attempted to open the Serreto road, and a company of

progress and the 3d Battalion of the 6th Infantry Regiment was sent there to complete them. With the arrival of darkness, the "first day of Montese" came to an end.

On the following day, with two additional battalions of artillery in direct support of the 11th Regiment, the attack continued. The enemy artillery and mortars reacted with still greater violence and precision, but Montebuffone and Hill 778 were occupied in



Valley of the Po.

American chemical mortar screened the captured positions with a dense curtain of smoke. Thus, Montese was captured and the attack was continued to Serreto and the vicinity of Paravento by the whole of the 11th Regiment.

On the right flank, the 2d Battalion of the 1st Regiment took Ca di Bertolino after difficult fighting. The enemy, reacting violently, pounded the positions he had abandoned and which were now in the hands of the Brazilians, with artillery and mortar fire. In Montese, mopping-up operations were still in

the face of stubborn resistance, and at the end of the day Paravento also fell.

The third day, strong reserves were sent into action to resume the attack. Two battalions of the 6th Regiment went into the line in the Serreto area. The advance of the 10th Mountain Division made it necessary to send the 1st Battalion of the 1st Regiment into the line, and the Brazilian Division was left with a single reserve battalion.

IV Corps, considering that this action had permitted the 10th Mountain Division to effect a substantial advance toward the

northeast, decided to "hold the positions it had attained," postponing the final attack which it was ready to launch.

The taking of Montese confused the enemy concerning the zone of attack of the 10th Mountain Division. The threat of the Brazilians on the triangle, Hill 927—Montello—Hill 888, by drawing the enemy reserves, made the resumption of the advance of the mountain forces possible. In addition to being the hardest won tactical success by the Brazilians in the Italian campaign, it was one of great significance in the victorious opening of the IV Corps Spring Offensive.

This strongpoint having finally been eliminated by virtue of the advance of the 10th Mountain Division, the 11th Regiment proceeded to an immediate mopping-up and reconnaissance of the remaining mined banks of the Panaro in that region.

IV Corps directed its Bologna offensive toward Mt. Tolo, Mt. Moscoso and Pietro. A wide breach was opened and the 1st Armored Division poured through it. The threat of a large hostile unit dispatched in haste from the coast, and the reported presence of considerable forces in Zoca, caused the covering of the western flank by the Expeditionary Infantry Division, to increase in importance.

Here, the Brazilian Division executed a new and interesting maneuver. The Montese sector having been occupied by the 11th Infantry Regiment, the 1st Regiment was moved to a second covering sector, Samone, and the 6th Infantry Regiment (passing through Zoca) was moved to the Guglia Sector. In Zoca it was necessary to execute an attack against enemy artillery, automatic weapons, and mortars. The attack was executed by the 6th Infantry Regiment. The flank was covered by the 1st, and had strong artillery support. From that time on the systematic destruction always engaged in by the enemy increased, and this required intensive work on the part of our engineers.

Finally, in one last advance the Expeditionary Infantry Division reached the suburbs of the city of Vignola, which it cleared

of the enemy and occupied together with the partisans of the region.

The Final Surrender

For the Spring Offensive, in which Bologna was initially the great military objective, 5th Army committed II Corps along the axis of Route 65 almost at the same time that IV Corps was sent forward over the heights astride the Reno and Panaro. On the coast, the 92d Infantry Division (U.S.) was taking Spezia. In the east, the British 8th Army was hammering at the gates of the large military center which supported the Nazi-Fascist operations in Italy.

The 10th Mountain Division and the 1st Armored Division, with the fall of Bologna, hurriedly departed northward, seeking to cut off the enemy retreat. This Fifth Army operation, together with similar operations by the Eighth Army in its sector, would cut off the retreat of the enemy, surround him, and cause him to surrender.

These plans led to the employment of the 34th Infantry Division along the Via Emilia with the mission of barring the remaining enemy forces, which were already beaten on the coast, from retreating to the Po. This was done to prevent any possible enemy attempt to reinforce the southern bank of the Po.

The Expeditionary Infantry Division was assigned the mission of advancing in a northwesterly direction close to the course of the Po, so that it could either join the 34th American Division or be used to prevent the transfer of enemy forces. The Po was finally crossed by units of the Expeditionary Infantry Division.

In the execution of its mission from Vignola on, the Brazilian Division, following the route south of and parallel to the Via Emilia, advanced rapidly northwest with successive contacts with the 34th American Infantry Division on its right flank, at the same time engaging in mopping-up, covering, and pursuit operations.

In this way, during the days of 25 and 26 April, its vanguard reached the Taro river and there established contact with the elements of a Fascist division, a Panzer divi-

sion, and the main body of the 148th Nazi Division which, having been defeated, were retreating from the seacoast trying to cross the Po and reach the northern end of the peninsula. Attacked in the vicinity of Collecchio, the Fascist vanguard resisted the

from the commander of the Brazilian vanguard by which you are surrounded. I shall expect a reply to this ultimatum within two hours." The German answer was: "A reply will follow as soon as instructions have been received from higher command."

Hence at 0001 28 April, three officers of the 148th German Infantry Division, including the chief of staff, appeared at the command of the 6th Infantry Regiment with credentials from the lieutenant general in command of the Nazi Division. The German representatives confessed their inability to continue the fight and the decision of their commander to surrender to the Brazilian forces.

The memorable days of 28 and 29 April witnessed, therefore, the surrender of the remnants of the "Division Italia" and the 90th Panzer Grenadier Division, as well as the main body of the 148th German Infantry Division, with all their impedimenta of war. General Mario Carloni, Fascist, and Lieutenant General Fretter Pico, Nazi, surrendered personally to the Commanding General, Brazilian Expeditionary Force.

Simultaneously, other Brazilian forces reached Placenza, making contact with and replacing elements of the 34th American Division. They shifted to the other side of the Po where



first attack of the Brazilian vanguard which cut it off from its main body in the region of Fornovo. The "ultimatum" of the 6th Infantry Regiment to the troops situated in the Fornovo-Respiccio region was as follows:

"In order to avoid useless sacrifice of life, we order you to surrender unconditionally to the command of the regular forces of the Brazilian Army which are ready to attack you. You are completely surrounded, and retreat is impossible for you. This order is

they engaged in patrol activity, and occupied Lodi and Cremona.

In the meantime, other Brazilian units advanced rapidly and reached Alessandria where they joined the American elements coming from Genoa, thus completing the encirclement of the enemy from the mountains southward. Shortly, thereafter, on 3 May the unconditional surrender of all the Nazi-Fascist forces in the Italian theater of operations took place.

The Navy's Part in Combined Operations

Digested at the Command and Staff College from an article by Rear Admiral T. H. Troubridge, in the "Journal Royal United Service Institution" (Great Britain) February 1945.

THE naval aspect of combined operations is an extensive subject, but whether the operation entails landing a number of divisions—when it assumes the proportion of an invasion, or whether it is on a smaller scale—such for instance as the operations against Madagascar or Anzio, the problems facing naval force commander are much the same and from the point of view of the individual naval officers and men in the landing craft and beach parties, almost identical. I intend to draw attention to some of the problems with which the naval force commander of a naval assault force is confronted in planning and executing a combined operation.

Success in almost every human endeavor depends upon the production of the preponderating force at the right place at the right time. In this respect combined operations differ somewhat from ordinary naval operations because the naval force is spread among a very large number of small units and, moreover, it is essential to success that these arrive at exactly the right place at exactly the right time.

Owing to the wide dispersion of the naval forces, command must of necessity be more extensively decentralized than is the usual naval practice, and this demands two things, (1) careful preparation and training and (2) perfect communications. The need for the latter has always been well understood in naval organizations, but only recently with the advent of efficient radio equipment have the extensive demands in combined operations been adequately met. Even so, communications still remain a problem requiring the most careful attention since the demand for channels of communication is of necessity limited by the amount of equipment and men to man it that can be accommodated in the ships.

Command and Training

With regard to the preparation and training of the personnel of the naval force, this

raises a number of problems peculiar to combined operations since the bulk of the naval forces required to support the operation is, unlike the army, engaged up to the last moment on its ordinary naval occasions—convoy escorts, minesweeping, and the like, from which ships can ill be spared for training in the specialized roles that they may be called upon to play on D-day.

In the early days of combined operations the training of the purely combined operations naval forces, i.e., landing craft news, naval beach parties, etc., was under the chief of combined operations, while the naval force commander appointed to command in the operation was, until the final grand rehearsal, solely concerned with planning. He thus met his force for the first time just prior to the operation. This system, though admittedly for various reasons inevitable in the early days, is quite obviously fundamentally unsound. Command, by definition, involves complete responsibility for administration and training as well as operational direction of the forces under the orders of the commander, and although combined operations call for the temporary attachment of a large number of units from other commands to the naval force commander, the hard core of his force, namely that part of it comprising the assault elements, should be under his command in a manner similar to any other naval organization.

As a rule, the locality of a combined operation will have been selected by the government or the Supreme Allied Commander of the theater of war on information derived from an appreciation by the combined planning staff. At this stage the three force commanders—naval, military and air—are appointed and, having been briefed, are required to produce their outline plan for approval by the higher command. It is of great importance that this procedure be rigidly adhered to. Any attempt to force the responsible force

commanders to operate on a plan produced by the higher planning staffs may lead either to last minute changes with consequent delays and interruption of training or worse still, to failure. At this stage the predominant partner is the military commander since he alone is responsible for fighting the battle ashore and consequently must say where and in what force he wishes the army to land.

In drawing up the outline plan, the staffs of the three commanders must work in the closest touch and preferably under the same roof. As stated above, it is for the soldier to indicate where he wishes to land, his object in the early stages being to secure a beach-head, preferably including a port where the follow-up and supplies may be unloaded. It is reasonable to assume that any port in enemy hands, and indeed the most favorable landing places will be defended and consequently the first phase of the operation may well entail action solely designed to secure these favorable landing places. Every operation is different and it is not possible to particularize, but this much is sure—under modern conditions troops cannot fight effectively without their supporting arms, *i.e.*, guns, armored fighting vehicles, etc.; consequently, the first essential is to secure beaches where these can be put ashore expeditiously. Depending on the known enemy defenses the beaches may be secured by direct assault or by outflanking movements or a combination of the two. Fixed gun defenses must be taken out by commando or airborne landing or neutralized by aerial or sea bombardment or by a combination of all these methods. It is not possible to maintain the tempo of a combined operation while the enemy is able to bring directly observed fire on to the beaches and the offshore shipping. It goes without saying too, that local air supremacy is a vital factor and must be secured if necessary by the added intervention of naval carrier-borne aircraft.

Surprise

Having decided on the exact landing place, which must of course be suitable from the naval, as well as the military, point of view, the next question to consider will be the exact

time. This resolves itself into a question of a day landing or a night landing, which in turn is governed by the extent to which reliance may be placed on exploiting the factor of surprise and also on the extent of the enemy defenses. The question of surprise will always be debatable, and the longer planning proceeds and details of the operation become familiar to the responsible force commander, the less likely does it appear that there can be any surprise whatever.

It will probably be found during planning that where reliance is placed on a surprise landing the army will desire several hours of darkness in which to get the first waves ashore and the first objectives secured. Unless beaches are ideal and good exits from them assured the navy, while agreeable to landing infantry in the dark, prefers daylight for disembarking the all-important supporting arms which the army will insist must follow closely on the heels of the infantry. A good compromise is reached if the initial landings of the main body take place about an hour before first light. This should enable the infantry of the first waves to secure sufficient ground to prevent the beaches from remaining under observed small-arms fire and also allow the beach parties to make preparations for the reception of the supporting arms. The stronger the defenses, including as they may well do, antitank obstructions and minefields, the later should be the landings.

Naval Assault and Army Beach Groups

A naval assault group ordinarily consists of a squadron of minor landing craft, a naval beach commando, a beach signal section, ponton working parties for placing pontoons for unloading LST in shallow water, landing craft recovery units, and possibly other small specialized parties.

It is of great importance during combined operations to emphasize the need for the closest cooperation between the services. The air, whether naval or RAF, is predominantly both literally and metaphorically on the higher level; but the navy and army have opposite numbers at every stage down to the

assistant beach-masters who work with assistant military landing officers on the beaches. The sooner that all of these get on to the "Bert and Dick" basis the better, and this brings me to some remarks on the beach group which, though not forming part of a naval assault force, is at the same time very closely bound up with it. An army beach group is not a permanent establishment. It comprises essentially a force for local defense of the beaches of the sector in which it operates both ground defense and antiaircraft and a number of working parties for unloading stores, besides specialized units. Our practice has been to form the beach group around an infantry battalion, collecting the specialized units for a specific operation. The beach group is disbanded immediately after the operation or even while it is still in progress should circumstances necessitate the infantry battalion being withdrawn to provide reinforcements. Consequently the naval and military opposite numbers who have worked in close collaboration for some time and eventually been together through the priceless experience of battle are on conclusion of the operation separated, never by chance, to meet again.

Apart from the loss of the valuable morale qualities and experience which are developed in a combined operation this system has two principal disadvantages. In the first place a beach group, particularly those elements working opposite the navy on the beach, requires extensive training before an operation, the length of time depending upon the degree of opposition to be expected. Training of the naval and military beach parties must be carried out together. This means that having no permanently established beach groups a combined operation involving any substantial follow-up cannot be planned by British forces at short notice. In the second place lack of full-time military experts with combined operations assault forces means that we are handicapped in developing the technique of landing quantities of bulky supplies over beaches. I am speaking of course in general and do not refer to the Normandy landings where the whole resources of the

nation were engaged for many months with one special problem.

Bombarding Organization

The next preoccupation is the allocation of bombardment forces. I have found it best to allocate ships and major landing craft required for close support of the landings to individual sectors, and to retain cruisers and above under the direct control of the naval force commander. Naval bombardment, as everyone knows, has proved to be one of the outstanding features of the naval contribution to combined operations.

In the early stages of an assault it is usual to allocate specific targets to individual ships; spotting aircraft flown from the nearest shore base or from carriers being detailed beforehand in the operational plan. When the army moves inland it is probable that targets of opportunity will present themselves, and an effective way of dealing with these is to place all bombardment forces, *i.e.*, cruisers and above under a bombardment commander, usually the senior cruiser admiral who, working through the support control organization of the H.Q. ship, allocates ships to targets and makes arrangements for spotting aircraft if required. The advantage of this system is that, whereas in the early stages of the assault each sector works under its own spotting radio frequencies, later on when the number of targets is reduced air spotting can be handled on a single frequency for the whole area and it is only necessary for the bombardment commander to call for a spotting aircraft without having to specify the frequency to which its radio must be tuned. This greatly simplifies the procedure and any simplification in combined operations is to be heartily recommended.

Air Organization

I have not hitherto had much to say about the air side of combined operations, but this is because I am chiefly concerned with the naval problems. It goes without saying that no combined operation is likely to succeed without local air supremacy having first been secured and this involves fighters over the area both day and night.

One of the first requirements in any landing is the procurement of a landing strip ashore, and better still an airdrome, from which tactical aircraft can operate in close support of ground forces. In order to secure this the Royal Air Force have built up an organization of airfield construction units, including those priceless handmaidens of combined operations—the bulldozers, and what are called RAF servicing commandos, which the navy must put ashore among the highest priority services.

Just as it is usual for the military commander at each level to land when his own signals organization is functioning ashore and he is no longer dependent on the shipborne communications to keep in touch with the forward elements of his command, so the RAF commander as a rule plans to land when his signals organization is set up ashore. I think I am right in saying that it is now generally agreed that where any RAF aircraft participate in a combined operation, the air force commander will be an officer of the RAF of equal status to the force commanders of the other services. He controls all aircraft engaged in army cooperation or

defense of the area, whether naval or RAF, from the moment that the assault begins.

During the voyage, naval aircraft operating in defense of the convoys are controlled by the naval force commander who alone is responsible for the safe and timely arrival of the forces at their destination.

The air force commander will require a senior naval officer on his staff of the status of deputy or assistant air force commander to assist him in detailing the tasks required from carrier-borne aircraft, should such be present. The latter will in all probability be provided by the escort carrier support force specially formed for this purpose, and consists of fighters and fighter bombers with crews specially trained in all branches of army cooperation, including naval bombardment spotting. Experience in the south of France, where some two hundred naval aircraft from the escort carrier support force participated, indicated the great value of such a force at close call by the air force commander. Contrary to popular anticipation, the escort carrier support force operated continuously for ten days with a remarkably high record of maintenance and a surprisingly few casualties from landing accidents.

The Role of Malta in the War

Translated and digested at the Command and Staff College from a Spanish article by L. Saez de Pazos in "Revista de Aeronáutica" (Spain) March 1946.

WHEN the English occupied Malta in 1800, they could not even remotely have imagined that what they were thereby adding to their extensive empire was a future airplane carrier. But this is what it was used as, in the Twentieth Century.

At the beginning of the World War II there were only two powers at war in the Mediterranean, and both of them allied: England and France. Their interests crossed one another in time of peace, but they presented no obstacle in the way of their war activities. England made use of the Mediterranean as a route, or more accurately speak-

ing, as a short-cut in the Imperial route to India. Her line of positions, Gibraltar, Malta Suez (the English axis), was exposed to no threat on its flanks nor anywhere over its course and permitted of direct and effective communication with her overseas possessions. The communications of France with her North African possessions, her passage across the Strait of Gibraltar to others and by way of the Suez canal to the remainder of her possessions, was not interrupted or threatened.

The Mediterranean, during the period from the declaration of war till June 1940, oc-

cupied only (with the f which alert. In t fensiv began in the

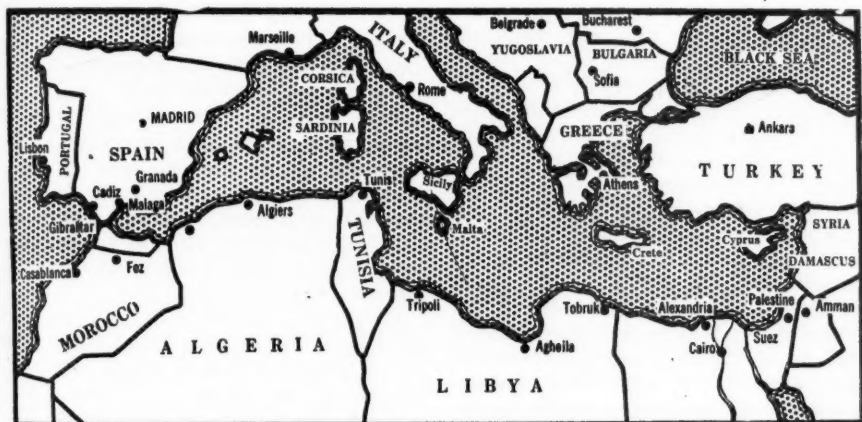


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occupied the attention of England and France only as an area requiring simple vigilance (with the consequent diversion of forces) in the face of possible intervention by Italy, which up to that moment was merely on the alert.

In the month of May the great German offensive in the western theater of operations began. France collapsed in a matter of days, in the face of the irresistible advance of

face of the Italian threat for she had a weak and extremely long communication line exposed to a serious threat over its whole distance. Italy had in her hands a wonderful opportunity to wipe out English power in the Mediterranean (at least in the central Mediterranean) since the English insular positions were represented by only 322 square kilometers of territory divided among three major and two minor islands which were



German tanks, supported by their aviation and finally, on 10 June, Italy entered the conflict.

In the face of this event the equilibrium of the Mediterranean was destroyed. The presence of a considerable fleet and powerful air forces, strategically located on insular and continental bases, threatened the English route with disruption and constituted a serious threat to the flank of the French communications.

A few days after the entry of Italy into the war, the signing of the armistice resulted in the disappearance of one of the belligerents, France, who shut up her merchant and war vessels in her home or her African ports, with the exception of a few units which remained with the English. The English position was a delicate one in the

isolated and surrounded by formidable air-sea positions.

The Regia Aeronautica had approximately 200 bombers and 200 fighter aircraft stationed in the central Mediterranean. The Royal Air Force at that time had little more than a hundred planes of various types available. They did not have to wait long for an attack. The first day of the war Malta received the "official" visit of the Italian planes which, before the day was done, carried out seven more attacks.

The situation was bad. But in spite of this, the island rendered a very important service. Its position was so favorable for observation that, for the English, it was as if they had an eye observing all movements carried out in the very home of the enemy. From there it was possible to observe

every movement made by the enemy's naval units, and naval reconnaissance occupied a large place among the few tasks that were performed by the few aircraft of the insular fleet. The radius of action of its planes permitted them to maintain a close watch over the movements of enemy vessels. And during the first few weeks, the planes of the RAF attacked points in Sicily and even bombed Italian ports, and Tripoli.

Another of its tasks was that of serving as a supply point for the bombers which, in their journey from England to Egypt, stopped at Malta for refueling. Otherwise, they would have been obliged to make a long detour, flying over dangerous regions of Central Africa where a forced landing would have been fatal. This applied also to mail planes, and hydroplanes carrying wounded.

One of the best services rendered by the island occurred in the month of November. In the face of the threat constituted by the Italian fleet, the English decided to deal it a blow which would render it useless, or at least put it out of action for some time. The information obtained from Malta permitted of their following all the movements of the Italian ships and of their being perfectly acquainted with their whereabouts. On the morning of the 11th, a plane was dispatched to Malta to obtain the photographs of the port of Tarento, which had been taken the day before by observers of the RAF from planes taking off from the island. These photographs showed the Italian fleet anchored in the harbor, and among its units could be counted as many as five battleships. The planes of the RAF patrolled the Gulf of Tarento up to 10:30 that night, and reported the arrival of a sixth battleship. Without doubt, this was the great contribution which aviation (and the island) made to the attack. The destruction of the fleet at Tarento was followed by repercussions in the Mediterranean campaign, and increased still further the strategic value of Malta, located as it was astride the communication routes of Italy with Africa.

In January 1941, the aspect of the struggle changed completely with the appearance of

the Luftwaffe in the Mediterranean theater. The first German attack cost the English the cruiser *Southampton*, and the destroyer *Gallant* and the carrier *Illustrious* were gravely damaged. German aviation also carried on a methodical destruction of the air-dromes of the island.

During the following months, a few reinforcements arrived from Egypt or were dropped off by carriers coming from Gibraltar. The latter consisted of some 200 *Hawker Hurricanes*. The planes from the island continued attacking Axis shipping and bombing Tripoli, Naples was attacked, and finally all ports possible, especially those which were ports of embarkation for Libya.

There is no doubt that during this period Malta made it possible to carry on a very successful war of attrition, since with relatively few planes it was able to interfere seriously with enemy communications and supplies. The danger from planes and submarines from Malta, obliged Axis ships to make an immense detour.

Near the end of 1941, because of the total elimination of a convoy coincidental with the withdrawal of Rommel toward El Aghella, the Germans decided to execute an attack on Malta for the purpose of destroying it. Kesselring had some 600 bombers brought from the Russian front, along with a good escort of fighters. These were hurled at the Malta air force, which had less than a hundred planes of various types.

Up to that time they had been employing some seventy planes weekly against the island, in groups of twenty. In December, the number of attacking planes reached 200 weekly, dropping a quantity of bombs ten times as great. During January, the aerial "visits" of the Axis reached the figure of 261, or an average of eight or nine per day. In February, the bombs amounted to double those dropped during December, and a convoy intended for Malta was unable to reach the island.

In March, 6,000 tons of explosives were unloaded on the island, a total of 500 tons being dropped in a single day's time. Ten

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thousand buildings were destroyed, but in spite of this the English aviation was still alive, and executed an attack on the ships concentrated in Palermo. It was now reinforced by *Supermarine Spitfires*.

But it was in April that the island suffered most. On the 5th of the month the Luftwaffe unleashed its great offensive—called the hundred-day offensive—and dropped 20,000 tons of explosives.

The paralysis of the island was almost complete, and from the air it presented the appearance of a besieged fortress. There were attacks which lasted thirteen and a half hours. The lighting system was put out of order. The Fawara aqueduct was put out of commission. Not a house but what showed evidence of the devastating attack, and the anti-aircraft artillery was so short of ammunition that its quota was but fifteen rounds a day per piece. During this month Axis shipping supplied Libya without being molested in the least, since the garrison of the island was fighting solely for survival.

It is surprising that the total destruction at Malta was not attempted at the very outset. The opportunity that was presented at the time of the French surrender was not taken advantage of, and in April there was another opportunity for an attack on the island. Intentions existed, but they were never put into effect.

Proof of this is contained in the diary of Count Ciano which says, under date of 12 May: "Rommel will attack in Libya at the end of the month with the object of crushing the British. (The attack began on 26 May.) If he is able, he will take Tobruk and will go as far as the old boundary lines. Otherwise, he will limit himself to the avoidance of an enemy attack by striking the first blow himself. At this time, all his forces will concentrate for an attack on Malta. The Germans are sending a division of paratroops."

But in the month of May the island reacted, especially when fifty *Supermarine Spitfires* coming from the American carrier *Wasp* succeeded in landing at the battered air-

dromes of Malta. They had scarcely arrived when they brought down fifty-five attacking planes. But their sorties were limited because of the scarcity of fuel.

Under the date of 20 June, Ciano says: "General Carboni has arrived at Rome to discuss the invasion of Malta. He is convinced we are going to suffer a terrible disaster. Preparations have been nothing short of infantile and our means are either ineffective or useless. Our landing forces will never succeed in landing, and if they do, they will be doomed to destruction. I am convinced we shall never succeed in this project."

Naturally, with such morale and spirit, no one could succeed. The chance was lost and never again was it presented in so favorable a manner.

Nevertheless, the need for getting supplies to the island was becoming urgent, and consequently an effort was made to get two heavily guarded convoys to the island—one from the east and the other from the west. The one coming from Alexandria met with a naval force composed of two battleships, several cruisers, and light units. This squadron was attacked by Beauforts and Liberators, but the convoy was forced to turn back to the point of departure in the face of the threat of the enemy forces, supported by German planes based in Crete. The one coming from Gibraltar succumbed to the attacks of the Axis, with the exception of two freight vessels which succeeded in reaching the port of Valetta. The Malta air force obtained some revenge by destroying two of the attacking cruisers. The assistance that had arrived was far from adequate and did not give the island sufficient strength for resuming the attacks in the strength in which it had executed them previously.

The island passed through an eight week period without receiving any supplies, and it became necessary to attempt to get another convoy through.

The convoy left Gibraltar and, for the purpose of achieving utmost security, was composed of two battle cruisers, seven light cruisers, four carriers, and twenty-four de-

stroyers, providing escort for fourteen merchant vessels. The importance of the convoy was such, and its volume so great, that it did not escape detection by the enemy reconnaissance planes. It was attacked before arriving within range of the fighter aircraft based on Malta. The attack was so violent that nine merchant vessels and four vessels of war were sunk—among them the carrier *Eagle*—but four merchant vessels and one tanker succeeded in reaching Malta. Then, for three months more, the island received no additional supplies by way of the sea.

After Rommel retreated from El Alamein in October, Malta increased in importance. As the English advance arrived at the Cirenaica salient, the convoys that were sent to the island were able to make the journey with air protection over the entire distance.

Soon afterwards, there arrived in Malta a considerable part of the planes that had been based in Egypt, in addition to Beaufighters and Beauforts, accompanied by an abundance of carrier based aircraft. Malta now went over to a state of uninterrupted offensive action which became a serious menace to the retreating troops. It began to attack the rear of the Axis troops, to disrupt their communications, to bomb their ports, and to pound their naval forces, more than ever before.

On the other hand the Axis aviation, now overpowered, was powerless to repel the action engaged in by Malta, and devoted its efforts to supplying and cooperating with its ground army which was very hard pressed by the advance of the Eighth Army, and with the presence of a new enemy who had landed in its rear and which threatened its retreat. The evacuation of the troops which were surrounded in Tunis was committed to the Axis air force, but the presence of Malta was not taken into consideration.

The prevention of the withdrawal of these forces by way of Sicily was perhaps one of the most important services that Malta rendered the Allies. The RAF maintained a watch day and night and German air transports were constantly attacked by English pursuit

aviation. The position of the island forced the Axis to give up the attempt to evacuate the whole of its army which was surrounded in Tunis.

A short time after the conquest of North Africa, Allied aviation began to attack the Italian islands in the channel. At the end of twelve days of air attacks, the garrison at Pantelaria surrendered. Ninety minutes after the surrender of this island, the air offensive was turned against Lampedusa, which surrendered in twenty-four hours.

The bombers which attacked Gerbini and Catania were escorted by fighter aircraft based on Malta, and the planes of the RAF became more and more active over Sicily and southern Italy, attacking communications, airdromes, factories, etc.

Afterwards came the landing in Sicily and later still, the landing in Italy itself. With the capture of the Sicilian airdromes and the surrender of Italy, Malta ceased to be an advance base and now found itself in the rear. It was now able to rest. It had fulfilled its mission well.

This is, briefly, the story of Malta during the battle of the Mediterranean. We shall now attempt to draw a few conclusions from the part it played in that bitter struggle.

The first thing we note is the advantage it gave to the English, to have at their disposal an observation post in the heart of the enemy area, a watch-tower from which they were able to observe all the movements the enemy made.

The second was the ability to intercept and render useless the enemy's communication routes. This became a constant nightmare to naval convoys which were forced into making a considerable detour, since their fear of its submarines—and still more of its planes—caused them to go as far as possible away from the island, with consequent loss of time in addition to necessitating the use of more fuel by the boats.

The third conclusion is that without Malta it would not have been possible to send special planes, supplies, and transports to Egypt by way of the Mediterranean. The island constituted an aerial supporting point.

From being a naval base it changed its role to that of an unsinkable airplane carrier, since the navy used it only for its submarines, and its surface units had prudently been withdrawn before the danger from the air had made itself felt.

The fourth, and very important conclusion, confirms the idea that fighter aviation continues to be the indispensable and basic element required for defense against hostile aviation. The island managed to survive only by virtue of its fighter aviation which fought ferociously, desperately at times, but which never permitted itself to be cowed by adverse experiences.

A fifth conclusion is that navies are not able to cross narrow water areas dominated by hostile aviation. Both the RAF of Malta and the aviation of the Axis achieved very notable victories over the other's shipping, including even the absolute annihilation of enemy units, when merely local or temporary air supremacy was obtained.

The sixth conclusion is based on the importance of possessing a few square kilometers of ground in some location of great strategic value. More accurately stated, it does not consist in the possession itself of the terrain, but in recognizing the value of this island and the role it could play. Malta was fitted out as a naval base, and as such was very highly regarded, but it

had sufficient flexibility, with the advent of aviation, to be able to adapt itself to its new role, and it played its part well.

The seventh conclusion consists of showing us the great error the Germans and Italians committed in not completely eliminating the threat represented by Malta to their military plans. Malta and its airdromes were like a malignant growth introduced into the organism of their communication and supply systems.

The eighth and last conclusion we are able to draw is one of a purely moral nature. As long as the attackers "were convinced a landing would fail" (even before attempting it!) the island could rest assured it would be able to survive, for in the face of such a conviction failure is certain. The garrison, however, was not aware that this state of morale existed in the enemy camp, and they acted in accordance with their own, which dictated firm resistance and keeping their flag flying over the island.

They resisted well and took maximum advantage of their precarious situation, in spite of the constant attacks of their adversaries.

Victory began to lead toward Malta the day on which, beaten and humiliated, the Italian fleet entered the devastated harbor of Valetta and gave itself up to the valiant garrison. On that day, Malta could well feel proud of her record.

Training a Citizen Army

Digested at the Command and Staff College from an article by Major E. A. Runacres, Royal Engineers, in "Journal Royal United Service Institution" (Great Britain) May 1946.

TRADITIONALLY we do not like wearing uniform, and the only tocsin that can normally stir us to put it on is the sound of the enemy's first shot. Yet in two wars we have had to raise a large army—vast in comparison with the total population—and the possibility of having to do so again in the future cannot yet be entirely dismissed. The problems that arise in training a civilian rather than a professional army have therefore

a peculiar interest to us; any help that experience and science can give us in speeding and simplifying such a task must not be overlooked here.

In Britain it is certainly more necessary than in some countries for public explanations to be given of courses of action, especially those which affect the individual's freedom; but unless they take the form of a direct propaganda blast directed on him

for civilian political ends, I do not believe that politics have a great deal of effect on the British soldier once at war and in uniform. He does not fight bravely because he believes that the object of the war is to turn the world into a better place, with refrigerators for all and a minimum weekly wage. His courage drives its piles down to rest on much more solid and primitive strata—determination not to draw back from a job, however tough, once he has put his hand to it, and his traditional pride as a member of an undefeated nation.

These feelings of his are usually too integral a part of his make-up to be expressed or even be conscious of. It is dangerous to proceed from an entirely mistaken interpretation of the part of the so-called "agitators" played in the army, to asserting that when training the citizen soldier in war it is essential to explain the reason for everything that is done in its relation to the whole objective of the war. Field-Marshal Montgomery's talks to his troops before battle had nothing to do with politics; they were severely technical, keeping strictly to the matter in hand—how the coming battle would be won.

It is widely believed that the political commissar is an important member of every Russian formation, and that his chief importance consists in, at intervals, haranguing troops under instruction with such remarks as "Why do we learn to use the bayonet, comrades? To exterminate Fascist vermin." I am far from suggesting that there is no need to bring home to every soldier from time to time the unpleasant object of war—the most rapid killing or reduction to powerlessness of members of the opposing side. But it is required far less than some well-meaning but ignorant admirers of continental systems think and, in any event with British soldiers, the introduction of semi-political matter into training is not the best means of achieving that object.

A more subtle error may proceed from a knowledge of the psychological principles of civilian education, if unbalanced by military experience. It is true that the best

type of education in normal life depends on awakening the desire for knowledge; once the spark is kindled it is only a question of feeding the fuel. Unfortunately, in the war-time army we are not dealing with the more brilliant type of child or adolescent. In fact, it comes as a definite shock to many officers (especially non-Regulars, perhaps straight from a university), to find when once the volunteer cream has been skimmed off, how low is the mental level of the general population from which the average army conscript is drawn. That level naturally goes on falling, as the vacuum-cleaner of intake searches ever deeper into the pile. When setting out to train such men, sail must be drawn in considerably and the object severely limited. The method which aims at teaching the learner gradually to see for himself why something is done, or done in a certain way, is too much of a long-term project. Training, like every other phase of war, can allow itself no circumlocutions; it must be brief and to the point.

As war becomes increasingly technological, it is the rapid inculcation of skills that becomes the main object of training. These could all be classed conveniently under the heading of discipline—the unhesitating, instinctive carrying out of an order at a certain level of efficiency, however strained or fatigued the man may be and in whatever danger. Discipline is a conditioned reflex, which every moment of life in the army works to build up from the time when the new recruit is first called to attention; such a reflex is easily inhibited, and that is why—as civilians and the press always fail to grasp—any actions tending to do so, even apparently trivial ones committed in peace time, are marked down for severe punishment in the Army Act. The grim shadows that stand before the court-martial president's eyes are those of the battlefield.

Discipline in the narrower sense would receive considerable reinforcement from the general method of training suggested here. Based on the realization that most men are not at any time, let alone in the heat and stress of battle, capable of coherent thought,

it attempts to build up a much wider system of conditioned reflexes, whether attuned to a word of command or certain other signs presenting themselves to the senses. When training men, for example, in putting right faults arising in some mechanical appliance, there seem to be three grades of ability that one might try to give:

- (a) Power to look at the fault, and work out logically how to deal with it.
- (b) Experience, which—although it could not always give a logical account of how it was done—could reach a high measure of success, merely by having seen a large number of examples.
- (c) Memory (instinctive and unconscious) of a certain sequence of motions to be gone through whenever certain signs present themselves.

These are arranged in descending order of difficulty and, as can be seen, shade into one another; in addition, each stage is a sound basis for the next higher. The final level to which one intends to bring any soldier must be largely dependent on the time allotted and his ability. I suggest, however, that it will be safest to make sure that the training method employed can bring everyone at least as far as (c)—the level which I have referred to in an earlier paragraph as a "skill"—before more ambitious projects are taken in hand.

An objection may be made that such training will produce mere automatons. It may be answered by saying that the object of all training is to get every soldier to *at least* this level; at present, by aiming too high or not aiming at all, we get results *below* it. Further, it is only after some reflection that one realizes how big a part the conditioned reflex plays in everyday life. By constant practice, the successive impressions which a ball makes on the retina as it travels towards us will set in motion, without any conscious thought, a complicated series of coordinated actions which bring the bat into connection with it.

The "thought" behind action may quite well make no difference at all; for example, a

man can cause a car engine to fire by turning the crank, even though he believes himself to be winding up a spring. Similarly, he can put right a breakdown by going through a series of trained movements in response to certain signs. If his truck stops, he has a set sequence of action:

- (a) He looks in the gasoline tank. If empty, he refills it.
- (b) Are any of the spark plugs disconnected? He reconnects them; and so on.

Knowledge of the principles of internal combustion or current induction are as little necessary for the production of quite a competent driver as is that of the theory of ballistics for a gunner. It is stressed again that this is the level which a soldier must attain unless he is to be a menace to himself and his comrades; if time and ability permit, there is nothing to prevent additions to any limit. Before this is attempted, however, the foundations must be absolutely sound.

Clearly, training on the lines suggested would mean a considerable change in the instructional method. At the moment the army still allows itself the luxury of choosing as instructors those who possess nothing more than a degree of information and a convincing exterior; little or nothing is laid down on the methods they are to use, and there is no way of separating the good from the bad except by mere individual opinion or, at a later stage, by the results they have produced. It cannot be safely argued in favor of this method that it is the one used at English public schools. The army needs, instead of this chaos, a simple drill which every instructor must be able to carry out before he is allowed to undertake the teaching of others. The inculcation of a skill (or, in other words, the formation of a conditioned reflex) can be made a matter for scientific study, and this would be reflected in a rationalization of textbooks and training methods.

Perhaps better than any human instructor would be a machine like the Synchronophone, already used with considerable success in training RAF pilots. It consists of a

screen on which a picture of any part of the object being taught can be lighted up at the touch of a button, and a radiogram which plays records of the commentary. The lesson can be repeated identically an indefinite number of times, with speed and pauses completely under control; visual and aural appeal can be accurately balanced. Such a method would, however, only be suitable in a fixed training establishment where the necessary capital outlay was justified.

I do not propose here to go into the technical details of the instructional methods which would be used, and which any competent psychologist could devise. It may be worth mentioning, however, that as our object is to teach the soldier not to think, but to act—to move his body in a certain required manner—the method of training must be based on a logical consideration of that object and of the way in which mental processes work. It would, for example, relegate verbal matter to a comparatively unimportant place, and give much more weight to the visual and imitative faculties. This is of particular importance with reference to a point already mentioned—the mental level that may be expected in a large percentage of conscripts during a war. The ability to work with words and mental images rather than

with bodily action is a highly developed one which many men never acquire. To understand this fact is to have grasped the main factor in all training.

A necessary pre-requisite to the use of such instructional methods would be a time and motion study, scientifically conducted, of every section of individual training and such parts of group, platoon and larger unit training as proved amenable. The relevant training pamphlet would show the motions to be taught in each lesson; the pamphlet on instruction (detailing the drill by which such motions were to be taught) would, of course, apply to all. The method of instruction could be taught as easily as parade-ground drill; there would be no more looking round units to pick out for instructors N.C.O.'s with the most impressive "personality."

Speed and mechanization are the two main trends of modern war. If we are to take a realistic view of the problems involved in training a citizen army for such war, we must overhaul completely our present so-called system and get to work on organized, scientific lines. Training has for too long been a recalcitrant child, noticeable for its wayward conduct; it is high time that it was brought into line.

Men and Machines in Modern Warfare

Translated and digested at the Command and Staff College from a Russian article by Major-General M. Galaktionov in "Krasnaia Zvezda" (U.S.S.R.) 13-14 April 1946.

WORLD War I demonstrated the tremendous and constantly increasing role of matériel. It was characterized by a noticeable increase in the strength of all armed forces, and it emphasized the necessity for the mobilization of all the resources of warring nations. In the period between the two wars, the lessons learned in 1914-1918 were carefully evaluated and new military machines and new tactics were conceived and developed.

Before 1940, the French army was considered the best in the world. Infantry was its principal arm. It was mechanized and possessed great fire power. Its basic unit was the infantry squad built around the light machine gun. Artillery was organized according to the pattern of World War I. That is, in the defense it was supposed to stop hostile attacks, and in the attack artillery fire was to move ahead of the supported troops. This was the doc-

trine of position warfare. It was believed that hostilities would immediately be concentrated along fortified fronts, and these fronts the French had built beforehand. In this conception, the principal part was to be played by weapons while the human factor was somewhat belittled. The French school tended to neglect the combat spirit of the soldier, paid little attention to officers' initiative in combat, and caused a distaste for maneuver among its generals. Furthermore, the value of new types of machine guns, tanks and aircraft was underestimated and there was a lack of foresight in the development of new types.

The Germans, on the other hand, gambled on tanks and aircraft. The positive side of their doctrine was the return to maneuver. Their tactics and strategy were based on the employment of large tank units, motorized troops, and light infantry. The latter was armed with automatic weapons, mortars, and artillery guns of small and medium caliber.

The backbone of the army was the tank, employed *en masse* and supported by aviation. On the heels of the tank divisions moved motorized infantry. Mobile equipment, light weight but plentiful, fire weapons, and men trained for action in combat machines and with these machines, were welded into one maneuvering force of great shock power.

Was this army well adapted to all types of operations of modern war? Was it not a fact that the war to come would again feature protracted engagements in fortified zones, stabilized fronts, breakthroughs, etc.? Did not the Germans err in disregarding the possibility of position warfare in World War II? We all know that all these conditions actually appeared in the war, and that for these conditions the German army was not properly prepared.

One of the errors of the German General Staff was their underrating of the importance of artillery and infantry. The Germans did have good artillery and infantry, but the peculiar characteristics of

these arms were not properly appreciated. This is obvious now, for the war just concluded called for more artillery and more concentrated fires than the breakthroughs of World War I.

Thus, there was a certain degree of



The Germans counted heavily on armor.

narrowness in the organization of the German army. As far as matériel was concerned, it was dominated by tanks while the role of other arms, particularly of artillery, was underestimated. As for manpower, it was trained primarily for a

definite type of combat—that with tanks and aircraft. The emphasis on maneuver and mobile equipment is undoubtedly correct provided the strength of the enemy's defense is properly evaluated. But they failed to foresee that the development of offensive weapons and technique would be followed by stronger defenses, which eventually would surpass those of World War I.

Although the effectiveness of the German army at the beginning of the war had created the impression that the German system was a perfect union of men and machines, there was another serious weakness, and that was the somewhat one-sided and stereotyped tactical training. It is well known that the infantry, nowadays, is equipped with a variety of weapons and is divided into a number of highly specialized groups; but it has not ceased to be a separate and, at the same time, most important arm. It is the infantryman who exemplifies and embodies in himself the qualities of the fighter, and it is the infantryman who comes in direct contact with the enemy under a variety of combat conditions, and accomplishes all types of tactical missions both in offensive and defensive operations. The German infantry, however, especially at the beginning of the war, was looked upon as a sort of second echelon of the Panzer divisions, and although it accomplished its mission in a satisfactory manner, these missions were rather limited. The infantry was tied to the tanks and lost its most precious quality—the ability to fight independently of other arms.

The crisis which arose in the German army whenever their panzer divisions failed to gain victory (Smolensk, Leningrad, Moscow, Stalingrad) were not accidental. The German military machine, geared to *blitzkrieg*, stalled in new types of action. The German troops simply did not have enough flexibility to adapt themselves to new and unusual conditions.

In a certain sense, the machines of the German army suppressed its men. They counted on their matériel. Not that the Ger-

mans were inefficient in the employment of their technical equipment. Far from that. But their leaders had previously determined that their tanks and aircraft would win for them an unqualified victory and had built the entire organization, tactics, and training of troops on this basis. When the war confronted them with much more complicated and varied problems, it was found that the German army had not been properly prepared and that it was too late to retrain or to change it. These deficiencies were best demonstrated in the German artillery and infantry.

It was the venturesome tendencies of Hitler's strategy that caused this revaluation of the technical means of combat and the belief that these were capable of giving them an easy and quick victory. The entire German system was based on this conception of victory, and even the German soldier was hypnotized into believing in the omnipotence of the tanks, the plane, and the submarine.

Let us turn to the Red Army now. In 1941 and 1942 the situation was grave. The enemy had all the advantages, including numerical superiority in tanks and aircraft. It was necessary for us to gain time for completing the mobilization of our army and industry while the German *blitzkrieg* tried to prevent us from doing so.

First of all, we had to delay and stop the advance of the German motorized forces. We did not have enough tanks and planes, but we did have some. We had excellent artillery, and we had men willing to die for their country. Our tanks and motorized forces delivered blows at the rear of enemy tank groups which managed to break through. Our pilots made up for the lack of planes by their fearless and skillful flying. There were cases when either aviation alone, or only artillery stopped the onslaught of the German armor. These efforts of millions of Soviet people resulted in delaying the German advance toward Leningrad, Smolensk, and Sevastopol. All these were local successes. Of decisive importance was the victory near Moscow. It was won

when the Germans still had technical superiority. Thus, the battle of Moscow was the victory of our strategy, the victory of our troops.

The Stalingrad operation of encirclement, which resulted in the defeat of two German armies, was a classic example of correct utilization of moral and material factors. The German force at Stalingrad was formidable and well equipped, but it was defeated. This was done by the strong Soviet artillery, newly created tank and mechanized corps, air forces, and our infantry with its new weapons. In doing so, we maintained an almost perfect balance between *men* and *machines*. This correlation, or combination, of the human and material factors, however, was flexible and changeable with the situation. Thus, at Stalingrad the coefficient of matériel in our army was greater than at Moscow, for at Moscow we endeavored to keep the enemy from gaining a decisive victory, while at Stalingrad we aimed at the defeat of the Germans in the south.

Even when defeated, Germany did not want to surrender. She made another superhuman effort to rebuild her strength and her armed forces. When the grim experience of defeat had upset the theory of *blitzkrieg*, she tried, with feverish haste to correct her mistakes. The Germans built new types of heavy tanks and tried to catch up in the development of their artillery. As we learned later, German scientists had worked continuously on new technical developments such as new super-range artillery and new explosives of tremendous power. Even at that stage of the war the Germans had not ceased placing their trust in one or another form of new weapon capable of winning the war. Hitler and his advisers believed that all that was necessary was to find a new weapon and the war would be won.

In the Red Army, unlike the Wehrmacht, a complete development of all basic arms and services is noticeable. Our artillery has developed into a powerful arm and has preserved its paramount quality—the ability

to mass its fires quickly and where and when it is ordered. As for armor, motorized forces, and aviation, the Red Army has achieved a full development of their characteristics and advantages, while our infantry, reinforced by numerous and varied weapons and equipment, possesses to still greater extent those excellent combat qualities which justify its proud title of "Queen of Battles."

There are certain conflicting tendencies in the development of military machines. Let us take for example the speed of movement. The infantryman covers four kilometers an hour; the tank—twenty to forty kilometers, and the plane, from five to 600 kilometers. This poses the problem of which of these figures should be used in planning an operation. The Germans believed in speed. The French, not without foundation, considered this belief somewhat adventurous, and geared their army to the slow but reliable infantry. This phenomenon, caused by the development of modern weapons and machines, has also affected forms of combat in this war. High maneuverability was combined with the existence of fortified zones where all combat activities were positional in character. It is obvious then that victory was won by the army which was capable of both quick maneuver and stubborn position fighting. In the Red Army, where this was taken into account, and where all the arms were fully developed, there were always means and men for the accomplishment of missions in both mobile and positional warfare.

The most remarkable quality of the Red Army lies in the fact that all the arms and services are not only fully developed, but are also unified and harmonized. This unity, expressed in the idea of cooperation of all types of troops, was carried in the Red Army much further than in other armies. The French unity, for instance, was based on infantry supported by artillery, tanks, and aircraft, as it was done in World War I. The Germans unified their forces around the tanks, but both these conceptions were somewhat schematic and, in the end, too elementary. The unity of all types of troops in the Red Army is all-embracing and is based

on deep and thorough analysis of all elements of modern warfare.

As soon as the war was over, the problem of men and machines came to the fore again. This was caused by new developments in military technique. These were the atomic bomb, rocket developments in artillery, etc. There appeared new theories claiming the possibility of winning a war by the use of atomic bombs only. This idea, however, was belittled and criticized in the military circles of the United States. It was stated that the atomic bomb had changed certain fundamental principles of modern warfare, but not to any greater extent than was the case with the invention of gun powder, poisonous gases, tanks, and planes. In some of these cases, certain damages were introduced, but not to the extent originally expected. In spite of all the new inventions, the strength of the armies throughout the world kept growing constantly, and the defeat of Germany, despite her initial successes, has conclusively proved the fallacy of these and other theories which underestimated the importance of the human element in the conduct of war.

In any war, we are confronted with a certain balance or combination of men and machines. These groupings of men and matériel change as technological developments occur. So do people. For men dominate the world of machines, create them, and

control them on the battlefield. Of paramount importance, then, is the correct employment of both of these factors, the man and the machine. The strategist of today must have an unbiased and thorough knowledge of all available armament and equipment, for any one-sided solution results in only a temporary and unstable success.

Modern wars are fought in many theaters of operations extending over hundreds and thousands of kilometers, and are characterized by the employment of armies composed of millions of men and millions of tons of matériel. In these gigantic struggles, the organization of armed forces cannot be based on only one type of matériel, no matter how promising or how powerful it may be. Variety of combat missions calls for the highest development of all types of armed forces and of all classes of military matériel, and for the highest qualitative and quantitative indices on the part of the men fighting the war.

In the organization of armed forces, therefore, two guiding principles should be of paramount importance: First, the study of technological progress and its quick application in the practice of war, and second, continuous development and perfection of the existing arms and services, including the oldest, and still more important arm—the infantry.

When valor runs counter to obedience and concurs in prejudicing the effects of a clearly expressed superior will, it must then be regarded as a dangerous evil, not in itself, but because of the disobedience involved. All things in war must give way to obedience.

A Defesa Nacional (Brazil)

Mechanization and Mobility in Open Warfare

Digested at the Command and Staff College from an article by Major A. J. Wilson in "Journal Royal United Service Institution" (Great Britain) November 1945.

DURING the years immediately before the war, when the reorganization and re-equipment of the regular army was being studied and discussed, the terms mechanization and mobility were leading cries of the moment.

It was urged that increasing mechanization would lead to increasing mobility, and that the addition of further transport to the units would have the certain result of improving the maneuverability and handiness of the unit and formation concerned. The successes of the German Army in Poland in 1939 and in France in 1940 lent weight to the "all-out mechanization school" of military thought, and the British Army which reformed in England after Dunkirk was based on a wholly unprecedented scale of motor transportation in the expectation that it would finally develop into an instrument capable of beating the Germans at their own game.

The mechanization policy bore splendid fruit in the victories of the Eighth Army in the Western Desert and in the relentless manner in which Rommel's *Afrika Korps* was hunted on its long retreat from Alamein to Tunis. Only an army lavishly equipped mechanically and trained to think in terms of vehicles, as was the Eighth Army, could have maintained the momentum of the advance while dependent on such long and slender lines of communication. The Desert Army was an army based on trucks and composed of truck dwellers; the individual soldier of whatever arm regarded his truck as his home and as an indispensable adjunct to everyday life.

It was not until the Eighth Army crossed to Italy, and there came the almost simultaneous landing of General McCreery's X Corps as part of the Fifth Army at Salerno, that the problems of a highly mechanized army became fully apparent. In North Africa, the Egyptian and Libyan deserts, and to a lesser extent in Tunisia, the wheat fields

of the Goubellat Plain and Mejerda Valley, had permitted the free passage across country of all types of vehicles. Traffic blocks and congestion were largely unknown, except on rare occasions during the 'break in' phase of a battle before it became possible to unleash the armor in open country. In Italy, on the other hand, the country was largely mountainous, and the few plains were cut up by frequent irrigation ditches and the inevitable vineyards of southern Europe; consequently transportation was almost entirely tied to the roads, and movement across country became a thing of the past. The road system of Italy, in itself inadequate for the uses of a modern army, was not improved by the thorough and systematic demolitions carried out by the retreating Germans. Both in the advance from Salerno to the Volturno, and with the Eighth Army on the Adriatic Coast, traffic blocks became the order of the day, causing loss of time and temper to road users and seriously hindering tactical and strategical regrouping.

The events of January and February 1944, in Italy, however, were to show that not only was a highly mechanized army inclined in some circumstances to become enmeshed in its own maze of machines, but that a largely non-mechanized army, with its artillery almost entirely horse-drawn, was capable of re-grouping with remarkable speed to meet a new threat even in the face of complete enemy air domination.

The success or failure of the Anzio landing in January 1944, depended in the last resort on the respective abilities of the Allies to build up and reinforce their bridgehead, and of the Germans to concentrate an army to meet the new situation. All the odds appeared to be in favor of the Allies. Kesselring's armies on the main front from the mouth of the Garigliano to the Adriatic at Ortone were fully committed against the Fifth and Eighth Armies, while

such strategic reserve as was at the Germans' disposal was largely in the Florence area, and the necessary motor transportation to transfer it to the area south of Rome seemed to be entirely lacking. Furthermore, the complete control of the skies enjoyed by the British and American air forces made it certain that the Germans would have to re-group not merely under the threat, but under the actuality of continual attack from the air.

None-the-less, within ten days of the Allied landing at Anzio, Kesselring had succeeded in concentrating a powerful force to oppose the threat to Rome. At first content to contain the Allies, later, by determined counteroffensive, Kesselring was all but successful in driving the invaders into the sea. Only the admirable resolution and skill of the British and Americans in face of considerable enemy superiority in numbers were able to prevent this, but the saga of Allied bravery and devotion which is now inseparably associated with the Anzio beach-head should not be allowed to obscure Kesselring's remarkable military achievement in conjuring up, almost out of thin air and with the assistance of a purely extemporized transport system, a new army which was to contain the Allies until the end of May.

If Anzio had shown the ability of a non-mechanized army to re-group rapidly under unfavorable conditions, the pursuit north of Rome in June 1944, was to display the inability in certain circumstances of a mechanized force, even with complete command of the air, to close with and destroy a beaten army almost entirely lacking in motor transport and further handicapped by shortage of fuel. To the common soldier in an armored division, June 1944, was a study in frustration. Long lines of vehicles stood stationary on all the roads leading north from Rome or moved occasionally in clouds of choking dust a short and jerky journey forward. The opportunity finally to destroy the German armies in Italy was plain and evident to the meanest soldier. That it was being missed was equally evident. The Army of Italy was tied with bonds of its own making; al-

lowances of vehicles which had proved a boon and a blessing to the desert now blocked every road and clogged every artery from Cassino to Perugia. Faced by this vast amorphous traffic block, the German Army managed to withdraw, covered by the lightest of screens only, relatively intact and unharassed except by air attack, to a concentration area near Florence. From there a reorganized force was able to move south and successfully oppose the Allies at the end of the month on a line running east and west through Lake Trasimene. No further opportunity of destroying the German armies in this theater was to recur until April 1945.

Thus the fighting in Italy went far to disprove ideas formulated in the desert and elsewhere on the relationship between mechanization and mobility. Clearly the relation is not one of a simple arithmetical progression equally applicable to all theaters of war; it will be for the post-war soldier working against a more academic background and undisturbed by the pressure of operations to study the lessons learned and attempt to achieve a suitable balance.

What, however, were the primary causes of the mechanized paralysis which so hampered the movements of the Allies in Italy? They can be simply stated:

(1) A road system, in any case wholly inadequate for the needs of a modern army, further disrupted by skillful and thorough enemy demolitions.

(2) Excessive numbers of vehicles of all types using the various axes of advance.

(3) Indifferent traffic discipline on the part of the troops concerned coupled with insufficiently ruthless traffic control.

For the inadequate road system there was, of course, no immediate remedy except hard work; and no praise can be too high for the devoted, dangerous and practically non-stop work; and no praise can be too high for the operations. It is however, worth while to examine the factors which caused excessive numbers of vehicles to use the roads at a critical period, for this was a state of affairs which could well have been avoided

had it been possible to appreciate earlier the nature of the problem.

Bad traffic discipline speaks for itself; it was largely due to thoughtlessness and lack of understanding on the part of regimental officers and men and moreover was for the most part inexcusable in view of the insistence, both before and during the battle, of commanders and staffs at all levels on the need to keep the roads clear. The partial failure of the traffic control arrangements can be traced to a variety of causes, notably the shortage of provost personnel, the difficulty of communicating a rapidly changing picture and scheme of priorities to a number of scattered policemen, and the natural reluctance of the police themselves to deal ruthlessly and on the spot with offenders of whatever rank against the traffic regulations. Double banking for example, the cause of many a traffic block, would have been quickly stopped if penalized automatically by a three-hour spell in a field before being allowed to continue the journey.

How could the number of vehicles using the roads have been cut down without affecting the efficiency of operational units themselves? These units in any case were operating on a light scale (in most cases less ten per cent of their Table of Organization strength) and could not have been further curtailed without detriment to their operational efficiency. Nor were the fighting units really responsible for the chaotic state of the roads, since by far the greater volume of traffic was employed on administrative duties.

This administrative traffic could possibly have been considerably cut down by a step which was never to my knowledge taken in 1944, though it was employed on several occasions in the pursuit to the Alps in 1945. Each vehicle of every unit carried five days' reserve of rations and 100 per cent reserve of fuel. What could have been simpler than to have stopped all replenishment except that of ammunition, which is never a problem during a pursuit, and forbidden the movement on the roads of service vehicles within the corps area? With the roads thus cleared, re-grouping would have been quickly and eas-

ily carried out. As it was, units carried five days' reserve rations and countless cans of fuel triumphantly from Cassino to Florence without ever having occasion to consume them, while the roads behind them were blocked by long convoys of replenishment vehicles bringing up the rations daily in the normal way.

Further congestion was caused on the roads by corps and divisional maintenance areas being often too far forward in a praiseworthy attempt to cut down the distance to be traveled on replenishment journeys by unit transportation. But this entailed bringing forward a much larger number of load-carrying vehicles, thus blocking the roads nearer the front and causing the time spent on the roads by the drivers of unit transport to be as great, if not greater, than if they had traveled ten or fifteen miles farther to the rear on a relatively uncongested road. It is worth noticing in this connection that the worst traffic blocks occurred at Cassino in 1944, when the corps maintenance area was within six or seven miles of the battlefield, while movement was much easier in 1945 when events moved faster and long trips were made by unit replenishment vehicles back to maintenance areas which had been left well in rear of the pursuit.

Another factor contributing to the excessive quantity of transportation moving in the forward areas during this period lay in the very large proportion of artillery which it was attempted to deploy. The nightly harassing fire tasks which were the main role of the heavy artillery during this period could well have been carried out by medium guns operating with the command of the divisional artillery concerned.

This excessive concentration of artillery with the forward troops during a pursuit is only one example of the laudable desire on the part of all units to get forward and see the fun! However laudable the motive, it cannot be denied that the rush to get on the road which starts as soon as operations become mobile is a menace to organized movement on the roads and needs therefore to be carefully controlled. Administrative units,

in particular, should move as infrequently as possible and then by means of the longest possible bounds.

Finally, it would be difficult to find many cases of redundant vehicles in the actual Tables of Organization of fighting units. It is in the control and movement of the existing scale of vehicles that the army has most to learn. It was perhaps fortunate that, in the spring of 1945, the Eighth Army had a solution of the traffic problem forced upon it by pressure of circumstances, since shortage of bridging equipment allowed for only two bridges over the Po. In consequence it proved a physical impossibility for unnecessary vehicles to get forward, with the happy result that thereafter traffic blocks were virtually unknown and it thus became relatively easy to maintain the speed of the advance.

To sum up: the most highly mechanized army is not always the most mobile, except under very exceptional conditions of terrain, e.g., North Africa. The degree of mobility which can be attained by a largely non-

mechanized force can be considerable, while a highly mechanized force is always in danger of hampering its own mobility by a form of self-imposed paralysis. This paralysis can, however, be to a great extent avoided provided that ruthless steps are taken to cut down the number of vehicles using the roads in the forward areas. Furthermore, this object should be achieved without detriment to the efficiency of operational units by concentrating ruthlessly on administrative services and units not directly engaged in current operations. If the problems as well as the advantages of increased mechanization are taken fully into account and adequate steps taken to circumvent them, a disciplined and mechanized force even in difficult country can achieve something of the standard of mobility envisaged by the purely theoretical military thinker. But staff and regimental officers alike must remember how narrow is the dividing line which separates ordered mobility from chaos and confusion; the former can only be achieved as a result of rigid discipline and the determined cooperation of all ranks.

The Army of the Future

Translated and digested at the Command and Staff College from a French article by P. Coeur, in "France d'Abord" (France) 19 June 1946.

THE military history of the first half of our century teaches us that the technical progress stimulated by each and every war sets the pattern for the military operations of the future.

Although the last months of the World War I saw the appearance of the motor on the field of battle, neither the tank nor the airplane was used efficiently on a large scale. But by 1918 it was evident that a new conflict would see the triumph of the internal combustion engine; a fact which, especially in France, was understood by only a minority of the military profession.

The first clashes of 1939 revealed a new element which was to characterize six years of operations: the artillery had become mo-

bile. Towed, self-propelled, and armored, it had become capable of rapid concentrations of guns, followed by unheard of concentrations of fire. It hunted down the enemy, broke into his rear areas, carried its fire to vital centers. It was not able to get along without the infantry. Hence, it joined forces with it. The foot soldier was carried on the tank, or hurled ahead of the towed artillery, and distributed rapidly over the conquered terrain. The foot soldier, the tanks and the cannon had become as one. The artillery had become an integral part of the infantry regiment of the battalion, and even of the company. Tactical groups and "combat teams" were created. Their mobility put an end to "static" strategy. World

War II was won by the motor, placed at the disposal of the infantry and artillery, in formations of extreme mobility. It was won by the combination of tank, motorized artillery and infantry.

However, it is already possible to affirm that the time is at hand when it will no longer be possible for the tank to win a war. The last war disclosed the fact that the enemy is especially vulnerable in his rear areas, a discovery which was not only exploited by means of breakthroughs followed by rapid advances, but one which is also affirmed by the appearance on the field of battle of two basic elements: the airplane and the partisan.

Aviation can look forward to a still greater role in case of another conflict. The methods of employment prevailed during the course of the war which has just come to a close: the Soviet and the Anglo-Saxon methods.

As for the first, powerful, speedy, armored aircraft with limited ceiling provide direct support for ground artillery. They are a precious aid in breakthrough attacks; they break up local counterattacks; they attack the enemy from the front. This method, which obviously was imposed on the Soviet generals by the geography of their country and by the fact that they had their territory to liberate, put the airplane in the same category as the cannon. It makes the plane an extremely mobile gun dropping a maximum of projectiles on the target. On the Anglo-Saxon side, aviation becomes a very long range artillery of maximum power which frequently does not exterminate the enemy forces on the field of battle, but whose principal mission is to destroy his reserves, his capacity for waging war, and his will to fight.

The attack of the enemy's rear areas was the sole aim of the partisans. The mass appearance of partisans was a result of the character of "modern" warfare. All war of movement involves the occupation of territories. But with millions of partisans waging a merciless crusade for liberty, it becomes obvious that war is no longer a monopoly of the professional army—the magnificent proof of the fact that the civic

spirit of a nation is the touch-stone of the military might. The partisan attacks the enemy, destroys, exhausts, and unnerves him to the point of desperation. The prodigious success of the Soviet partisans, and the speed with which insurgent France was liberated, are proof of the effectiveness of this form of warfare.

The airplane (the most mobile of our weapons) and the partisan (or, rather his combat methods which are symbolical of voluntary and complete mobilization) are the fore-runners of the strategy which would be essential if humanity were to be torn by another conflict.

In a future war an aggressor, having no partisans at his disposal in the enemy's rear areas, will be tempted to replace them by troops trained to carry out the same military tasks. Aircraft alone are able to transport these troops into the enemy's rear. That is why success will depend on the effectiveness the aggressor will have been able to impart to his combination aviation-infantry, that is, his paratroops.

What reply could be made to such an offensive? Assuredly not that of a professional army concentrated on a frontier. Does this mean that we are to distribute our professional army over our entire territory? How ridiculous such a suggestion would be, if one stopped to think of the strength of the forces thrown into action by the attacker. Since there exists the chance that the latter will be everywhere, it is necessary also that the defender be everywhere—and in greater strength than he. Only permanent mobilization of the masses of the population in the attacked areas themselves, is able to insure such a reply.

What then, will be the characteristics of the modern army? The soldier must receive his military instruction but a few kilometers from his own home. It is in his own village, in his own district of the city, or in his factory, that he must be mobilized. Short but frequent periods of instruction must keep him posted in the matter of technical advances. We should even plan to impart this comple-

mentary military instruction in the village, in the city district, and at the factory.

If he is in the zone that is initially attacked, on a soil that he will defend with fierce resoluteness because it is his own, the modern soldier must be able immediately to counter the enemy attack with partisan warfare tending toward the paralysis and destruction of the enemy troops that have been dropped from the air.

If he is outside of this zone, it is necessary that his local unit be able to find its place in the large unit in a very short time so as either to be transported immediately to the vicinity of the attacked area or to create an interior front opposing the enemy.

Either of these two alternatives presupposes the existence of a powerful decentral-

ized air fleet, and a very advanced degree of military training on the part of the man in the ranks. Now, the brilliant success of some training camps proves that it is possible for a young man to acquire, in a few weeks time, sufficient military training to be able to take part in formidable combined operations. Periodic practice in local units is to be engaged in for the purpose of maintaining this training.

As for the morale of the troops, it suffices to recall that only an army that is convinced of the justice of the cause it is defending is ready to accept the extreme sacrifices imposed by war. Hence, only a democratic and republican ideal is able to permit of the complete mobilization of a nation.

Mines Were Laid

Digested at the Command and Staff College from an article by Commander Kenneth Edwards, Royal Navy, in "The Navy" (Great Britain) June 1946.

MODERN developments have completely changed the character of certain weapons. This is probably more true of the mine than of any other method of inflicting loss or damage on an enemy. The mine is a very old weapon, but until very recently it has been regarded almost entirely as a defensive weapon. The reason was that it was immobile and could only be laid in waters to which one's own ships had free access. In those circumstances it was considered pre-eminently the weapon to bar the approaches to harbors or to coastal waters to enemy raiding craft.

The mine still performs this function, and by far the largest number of mines laid during the recent war were laid in "defensive" fields such as the great mine barrage which extended off shore the whole length of the east coast of the United Kingdom.

In the recent war, however, mining became an exact offensive science for the first time in history. During the 1914-18

war a small number of mines were laid "offensively" in clumps off the entrances to enemy harbors by British submarines, but these were more in the nature of hopeful gestures than planned operations of war.

In 1939-45 things were vastly different, and the mine became a potent offensive weapon. This was simply because the ability of aircraft to lay mines made it possible to place these weapons in enemy waters—and even harbors and rivers—to which the ordinary mine-layer could not hope to penetrate. Aircraft have, in fact, completely changed the strategical and tactical form of mine warfare.

The British minelaying effort during the last war can be divided into two distinct parts. There was the purely defensive minelaying, which was by far the greatest undertaking and demanded 186,388 mines of the total of 263,088 mines laid. The greatest part of this defensive minelaying was concerned with the laying of the great East



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Coast Barrage which extended off-shore from the north of Scotland to its junction with the Dover Barrage. There were other big defensive minefields, notably the Dover Barrage and the mine barrier laid between the northwest of Scotland and Iceland.

These big fields were composed of moored mines designed and laid in order to deny, or make dangerous, the passage of surface ships. In addition to these there were extensive fields of "deep" mines laid with a view to destroying U-boats. These areas were normally safe for the passage of a surface ship and consisted of tiers of mines laid at different depths in order to trap U-boats. Two of the largest of these "deep minefields" were those laid off the north coast of Ireland and at the southern entrance to the Irish Sea. There was a small minefield of this sort off the Isle of Wight which had to be swept before the big liners could again use Southampton, since these large ships drew enough water for the minefield to be dangerous to them.

The whole of this great task of laying the defensive minefields devolved upon surface ships. Most of these were converted merchant ships, and they included large freighters, train ferries, and car ferries.

These defensive minefields not only acted as a strong deterrent to, and circumscribed the movements of enemy forces, but also inflicted some casualties. By far the majority of the casualties inflicted on the enemy by the British mining campaign were naturally caused by our offensive rather than our defensive minelaying. These offensive mine fields were laid in enemy waters, and frequently even in enemy inland waterways. For such a task, of course, aircraft had to be used as minelayers. Ships were, however, also used, particularly submarines, fast minelayers, motor torpedo boats, motor launches, and destroyers.

About 76,700 mines were laid in these offensive fields, and of these, 56,300 were laid by aircraft.

These offensive minefields inflicted a great deal of loss and damage upon the enemy. They also played an important part in help-

ing to disorganize the whole of the enemy's transport system, as well as absorbing a very appreciable portion of his war effort in minesweeping. The area in which most casualties were inflicted was, of course, the Elbe estuary, the southern part of the Baltic and the Baltic approaches. In all, a total of 1,050 Axis warships and merchant ships were sunk by our mines during the European war and a further 540 ships were damaged. Some of these casualties were



Mines in position for sewing by mine-layer.

imposed in strongly protected inland waterways such as the Kiel Canal and the Danube. All the main river estuaries of enemy occupied Europe were also mined.

An analysis of the losses inflicted on the enemy by our mining campaign reveals the extent to which it was directed against the enemy's transport system. No less than 144 lighters and barges fell victim to our mines. More important still, forty-seven tugs were sunk and six more damaged, thus immobilizing a further large number of barges.

In considering the whole effect of our mining campaign it must be borne in mind that most of the losses inflicted by our offensive minefields were in narrow waters, so that a casualty often meant the blocking

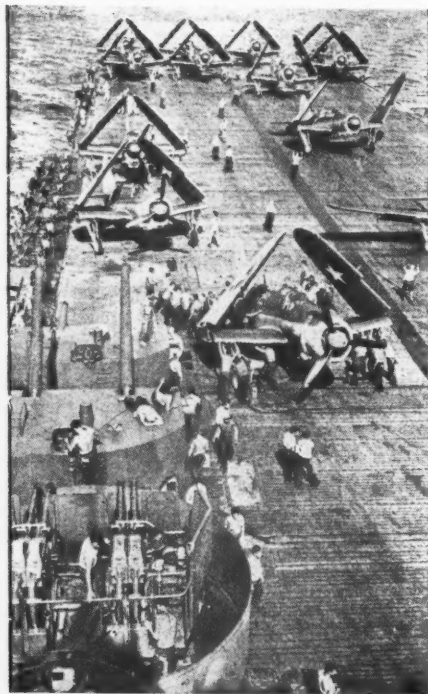
sembled within visual distance of the battleship. The aircraft orbited *Yamato* and an escorting cruiser out of flak range until the signal for attack was given. The fighters went in first with rockets and heavy machine-gun fire to intimidate the flak defenses. Close behind the fighters came the torpedo-

the enemy lost 500 aircraft, and as a result the remnants of the navy.

After Pearl Harbor it was appreciated by the Allies that the strategic key to the control of the Pacific was the neutralization of Japanese air power in Micronesia. Once this was accomplished, bases could be established in the archipelago from which to launch offensives against the Philippines and Indonesia, with the higher aim of cutting Japan's communications to her conquests; and from Micronesian bases the strategic bombing of Japan could be started.

The American task forces relied entirely on carrier-borne aircraft for air cover—the airfields in Hawaii were too far from Micronesia to allow land-based aircraft to afford air protection. The preliminaries to an assault on an enemy stronghold were nearly always of the same pattern. First, local air superiority had to be achieved, and to this end the enemy reserve aircraft centers became the Allied objective and were subjected to heavy and concentrated attack. Reinforcements were thus prevented from streaming to the threatened island base. Simultaneously the base itself was strafed by fighters and bombers, whose primary targets were enemy aircraft, grounded or airborne. The Japanese were either shot out of the sky or destroyed on the ground. With air superiority achieved over the assault area, the troopships and transports could move inshore and deploy the assault troops, while the escorting warships bombarded enemy strongpoints on the shore. Meanwhile, the aircraft turned their attention also to enemy strongpoints, such as pill-boxes, coastal guns, fuel dumps and communications and troop concentrations.

Finally, the assault troops moved on to the beaches under cover of the air umbrella and closely supported by the aircraft when necessary. As soon as resistance ended, and air base was established from which to attack other islands, this time, however, using land-based and carrier aircraft; and from these permanent, unsinkable bases allied air power was exercised to neutralize



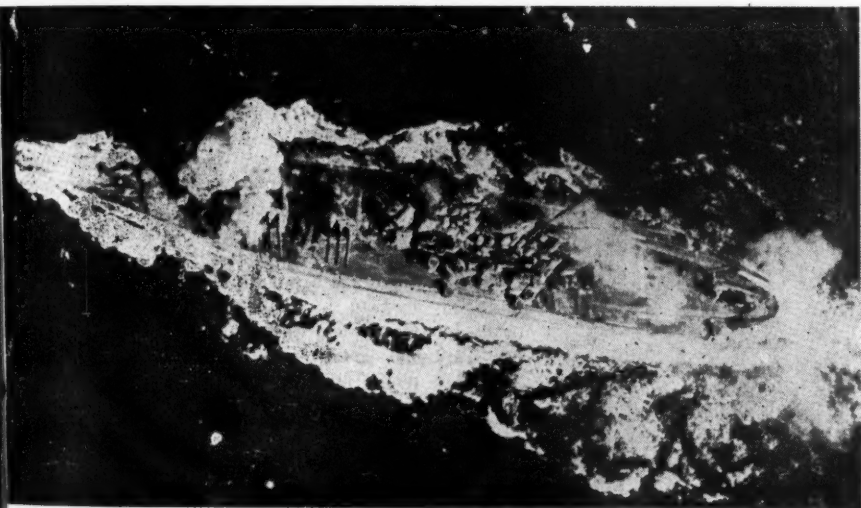
Carrier-based planes being readied for an attack.

bombers and dive-bombers. The defenses were swamped, to the extent that only seven aircraft were lost, a small exchange for a battleship, not to mention the other units and probably some 3,000 naval personnel. Japanese air opposition was non-existent owing to the offensive sweep by Admiral Nimitz prior to the engagement. Carriers penetrated the Inland Sea and challenged Japanese home-based air power so successfully that

the enemy air power on strongly defended positions.

The seizure of Saipan marked the close of the first phase of the American offensive. The B-29's moved in and added weight to the strategic bombing offensive which had opened on a small scale with attacks

and destroyed some 800 aircraft in twelve days. Concurrently, strategic bombers from Saipan and China attacked air bases in Formosa, and aircraft based on Palau and Morotia ranged over the southern Philippines and the East Indies. These attacks served to disrupt the flow of reinforcements to the



The Japanese battleship *Yamato* under attack by U.S. planes.

in Japan by 20th AF super-fortresses based in Chengtu.

Japan is 1,200 miles to the north of Saipan. The long trip across water had the one advantage that it was not over enemy territory and the bombers were untroubled by flak. But owing to the great distance, fighter escort was out of the question, and enemy fighters had to be dealt with by the bombers themselves. Fortunately, the high ceiling of the B-29's made it difficult for the Japanese fighters to intercept.

The greatest defeat for the Japanese Air Force, however, was during the landing at Leyte, Mindoro and Luzon in the Philippines. In the softening-up phase prior to the Leyte landings, Allied carrier aircraft struck at the enemy air power from the Ryukyus down through Formosa and into the Philippines

threatened points, and left the American task forces to deal with the temporarily isolated enemy air power around Leyte, which was quickly neutralized.

Amphibious forces landed and it then became a race between the preparation of air strips on Leyte and the arrival of reinforcements from Japan.

With secure bases in the Philippines, allied air power was able to dominate Japan's supply lines to southern China, Thailand, Burma and the East Indies.

Then came the seizure of Iwo Jima as another base for the strategic bombers and one close enough to Japan to permit long-range fighters to escort the bombers. Moreover, its seizure removed the threat offered by Japanese fighters to the strategic bases at Saipan. Lastly, reconnaissance planes

could thoroughly photograph the Japanese coast, a task unsuited to the high-flying B-29's owing to frequent and extensive cloud formations over Japan. The Japanese could not be sure whether the final assault would come direct or through the Ryukyus, the Kuriles or from China or Korea. They could not be strong at every point of attack and were obliged to spread their defenses thinly or concentrate on likely points of attack.



Damaged Jap plane attempts to crash into a U.S. carrier.

Only by air photography could we obtain reliable information about their dispositions.

When the American and British task forces attacked and occupied Okinawa, the island became a base which served a twofold purpose. It is 500 miles from southwest Japan and therefore the strategic bombers could operate with fighter escort. But its immediate importance was that it enabled the allied air power to strangle Japanese supply

lines, already gravely embarrassed by air and sea power operating from the Philippines. Between Okinawa and Shanghai, 500 miles distant, ran the main Japanese trade route to the Formosa Straits and the southern conquests. Allied air power established air cover over the Pacific and East China Sea from Iwo Jima and the Marianas to Shanghai, and with the aid of warships and submarines, and by mining, isolated Japan from her conquests and armies overseas.

Let us turn from the spectacular use of air power in the Pacific and examine its role in Burma. There the Japanese Army Air Force gave air cover to the Japanese Fifteenth Army, and the Allies were forced to retreat to the borders of India. The Burma Road was cut, and supplies to China and to General Chennault's 14th AF based in Hanoi had to be flown over the famous hump. Gradually, while the Fourteenth Army held the enemy at the Indian frontier, Allied air power started to build up, and to make its weight felt. The Japanese had enormous difficulty in maintaining supplies through a country with poor communications, and depended to a large extent on air transport. Their air forces were imperfectly trained and units were withdrawn for further training at frequent intervals. Allied tactical bombers strafed their airfields and grounded aircraft while our fighters sought air superiority over the battle areas. Gradually the Japanese fighter strength was reduced, and the Allies obtained the coveted air superiority and with it the initiative. Now the Fourteenth Army could advance, closely supported by tactical aircraft, while long-range bombers attacked the Japanese communications at Rangoon and Bangkok and the 14th AF. Hunan harried the supply lines to Siam and Burma. But the remarkable feature of the advance was that the Fourteenth Army was supplied almost entirely by air transport. Because there are no roads in this mountain region there was, in fact, no other way to bring up supplies.

When Rangoon was recaptured supplies could be brought in by sea, and thus large fleets of air transport were released to aug-

ment the flow of supplies to China, over the new Burma Road, reopened with the occupation of Lashio by the Fourteenth Army.

With Burma reoccupied, the Allies quickly bought and established air superiority over Thailand and Indo-China, and with the aid of the Philippine bases cut enemy communications through the China Sea. Japanese forces in the East Indies, Siam and China were isolated and deprived of air cover as a preliminary to assault by land forces. Japan herself was greatly weakened by the denial of raw materials from her conquests, and by the continuous attacks of the strategic bombers. The time was nearly ripe for the final assault on the Japanese mainland.

The limiting factor in the weight of attack which could be delivered by the strategic bombers was the scarcity of suitable sites for airfields within bombing distance of Japan. There were more than enough bombers available when Germany was defeated, but unfortunately there were few bases to operate them.

And then, on 5 August 1945, Hiroshima was destroyed by an atomic bomb, the destructive powers of which were estimated to be the equivalent of 20,000 tons of high explosives. The Japanese were faced with the choice of immediate surrender or annihilation. To spur the decision, an atomic bomb was dropped on Nagasaki on 8 August, and the enemy surrendered unconditionally on 10 August. The assault on the Japanese mainland was unnecessary; the bomber had administered the *coup de grâce* as Seversky had always maintained that it could.

Nevertheless, when planning their air strategy for the Pacific campaign, the Allies could not afford to rely on the unknown po-

tential of the atomic bomb, however cataclysmic it might in fact prove to be. If it did fulfill the scientists' expectations, so much to the good. If it failed, the original and current plan to take Japan by a combined assault could proceed.

By July 1945, the island-hopping technique had brought the Allies to the stage when the assault on the Japanese mainland was an event of the near future. Japanese air power was on the wane, owing partly to its own inherent weakness of inferior training and aircraft, and lack of harmony between the Japanese Army and Navy Air Forces, resulting in operational inefficiency.

It would have been necessary to provide bases for the tactical air forces in support of the assault troops, and for effective support such bases would have been within 200 miles of the front line. Probably a large part of the tactical air forces would have operated from carriers. Early in 1945 the Americans launched the first of five carriers, each capable of operating eighty twin-engined bombers, which are most suitable for tactical support.

In all the amphibious operations in the Pacific, air power, sea power and land power were so closely associated that it is extremely difficult to distinguish the dividing line between the three arms. But air power was the predominant factor. Apart from the strategic assault on Japan itself, the fundamental issue in the Pacific was control of the seas, for with that control the Allies could maintain their bases and accumulate supplies for the next assault, and could deny the seas to the enemy merchant ships and navy; and control of the seas is automatically bestowed on the side which controls the air above.

Inter-Service Cooperation

Translated and digested at the Command and Staff College from a Spanish article by Colonel José L. Gálvez in "Revista de la Fuerza Aérea" (Chile) First Quarter 1946.

TODAY, more than ever, it is realized that national defense requires close cooperation, and that this should begin in time of peace, between the three branches of the armed forces which, in time of war, will bear the enormous responsibility of preserving the sovereignty and integrity of the nation, and of maintaining its freedom from domination of any sort.

This cooperation must not stop with theory but must be of a practical nature too. Mutual understanding must first be sought. This will in turn result in the development of a mutual esteem which is indispensable in the combining of tasks which concern the future commanders.

Only through the medium of living closely together during the various stages of their professional life is it possible for them to understand to any satisfactory degree the capabilities of each branch of the service with respect to the others. One is thus made aware of the efforts and acts of sacrifice of the other branches of the service in the fulfillment of their missions. There develops, consequently, a feeling of mutual understanding where there previously existed, perhaps, an unjustifiable feeling of antagonism. What was formerly negative and productive of dissociation is transformed into what is positive and stimulating. There arises, spontaneously and naturally, an attitude of esteem which is the undeniable foundation on which must rest all our future operative possibilities.

War has proved fully that all senior commanders should understand thoroughly the capabilities not only of the branch of the service to which they belong, but also those of the other related ones.

Will it be possible to satisfy these new requirements in a theoretical form except in those cases where the high commander, because of his rank, is in a position in which he has to deal with problems relating to three branches of the national defense?

I do not doubt that the training and ability of many of our commanders render them capable of dealing ably with such problems, but there arises another question: Wouldn't it be better not to leave these matters to individual and chance effort, but to attempt to establish contacts which, from the subordinate grade on up, would permit of the formation of the theoretical and practical store of knowledge that would produce these capacities?

I believe that this would be the only effective and real manner of guaranteeing the solution of a real problem which is as intricate and complex as that of directing the combined ground, sea, and air forces.

It would be well worth the sacrifice on the part of each branch of the service if there were an interchange of officers of various grades who afterwards would enable us to benefit by the advantages that would accrue from such an arrangement. This contribution would be a guarantee of the best and most advantageous employment of the means of each branch of the service. Our responsibility in the face of the obligation to defend our sovereignty would be felt as a joint responsibility which would be assumed on bases that were familiar to all, reducing to a minimum the frictions and difficulties inherent in complex, modern command.

This interchange should be started as far back as the military, naval, or air school, through the medium of courses which would make known the most essential and fundamental facts relative to the other branches of the service, making the most of their opportunity for imbuing young minds with the principle of cooperation. It should be continued, afterwards, in the advanced schools and academies in the form of mixed courses of a permanent character for the training of nuclei or senior officers capable of dealing readily with the problems which sooner or later they would have to meet whether as commanders or as staff officers with these high commands.

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